

APRIL, 1959



AMATEUR RADIO
AMATEUR RADIO
AMATEUR RADIO
AMATEUR RADIO

MAGRATHS

ENLARGED **SELF-SERVICE** SHOWROOM
IS BIGGER AND BETTER THAN EVER!

- THE MOST MODERN
PARTS CENTRE
IN AUSTRALIA!
- MAKES SELECTION
EASIER FOR YOU!
- ENABLES US
TO INCREASE OUR
ALREADY LARGE
RANGE OF PARTS!

★ **OUR PRICES
ARE RIGHT!**



Visit us **PERSONALLY** as soon as possible
and see what a difference we've made to the Centre!

HERE ARE A FEW LOCAL AND
IMPORTED BRANDS AVAILABLE . . .

AEGIS RADIO, TV & HI-FI EQUIPMENT
"SUPERSPEED" SOLDIERS, "RADIOTRON" VALVES
"STENTORIAN" HI-FI SPEAKERS
"CYLON" TV TUNING TUNERS & CONDENSERS
A & R TRANSFORMERS, "MILLARD" VALVES
A.W.A. RADIO & TV ACCESSORIES
"GOLDRING" MOTORS & PICK-UPS

"ANODEON" TV PICTURE TUBES
"COLLARO" HI-FI PLAYERS & CHANGERS
"ZEPHYR" PRODUCTS, "I.R.C." PRODUCTS
"ORTOFON", "WHARFEDALE", "LEAK" PRODUCTS
"M.S.F." SPEAKERS, "OAK" SWITCHES
"DUCON" PRODUCTS, "PHILIPS" PRODUCTS
"SKYLINE" GHOST-BREAKER TV AERIALS
"DUAL" PLAYERS & CHANGERS
"ROLA" SPEAKERS, "MINIWATT" VALVES

J. H. MAGRATH & Co. Pty. Ltd. SELF-SERVICE

FIRST FLOOR, 208 LT. LONSDALE ST., MELBOURNE, VIC.

FB 3731

RADIO
RADIO
RADIO
RADIO
RADIO
RADIO
RADIO
RADIO

1/6

AMATEUR RADIO

"HAM" RADIO SUPPLIERS

(KEN MILLBOURN, PROP.)

5A MELVILLE STREET, HAWTHORN, VICTORIA

North Balwyn Tram Passes Corner, near Vogue Theatre.

Phone: WM 6465

Money Orders and Postal Notes payable North Hawthorn P.O. Packing Charge on all goods over 10 lbs. in weight, 5/- extra.

NOTE THESE VALVE PRICES

Look at these Bargain Priced NEW VALVES—

1B5	2/6	6C5	5/-	7W7	2/6	958A	2/6
1H5	5/-	6C8	5/-	12A6	10/-	1626	5/-
1H6	3/6	6F6G	10/-	12AH7	7/6	1629	5/-
1K4	5/-	6H6	2/-	12H6	7/6	1851	5/-
1K5	2/6	8J5	7/6	12J5	7/6	2651	7/6
1K7	5/-	6J5GT	7/6	12K8	10/-	8003	10/-
1L5	5/-	8J6	12/6	12SA7	10/-	9001	2/6
1P5	5/-	6K6G	7/6	12SC7	2/6	9006	5/-
1Q5	5/-	6L7	5/-	12SJ7	10/-	100TH	25/-
1R5	10/-	6N7	10/-	12SK7	5/-	AV11	2/6
1R5	10/-	6N8	15/-	12SN7	12/6	CV6	2/-
1T4	7/6	6R7	5/-	12SQ7	2/6	ECR33	5/-
2A5	10/-	6S7	7/6	12SQ7GT	2/6	EK32	10/-
2X2	7/6	6SF7	12/6	12SR7	5/-	GL446A	12/6
3Q5	5/-	6SG7	12/6	45	5/-	VR96	15/-
3S4	7/6	6SJ7GT	12/6	78	2/-	VR100	5/-
5T4	12/6	6SL7	12/6	303	5/-	VR101	5/-
5U4G	12/6	6SN7GT	12/6	717A	12/6	VR102	5/-
5V4G	15/11	6SH7G	4/-	815	35/-	VR103	5/-
6AB7	7/6	6X5	10/-	829B	£5	VR136/RL7	1/6
6AC5	10/-	7A6	5/-	830B	20/-		
6AJ5	7/6	7A8	3/6	834	7/6	VT50	2/6
6AB8	12/6	7C5	5/-	866/DQ2	£1	VT52	10/-
6B4	12/6	7E5	2/6	885	7/6	VU39	2/6
6B7	10/-	7E8	3/6	956	5/-	XG1M	12/6
1C7	3/- each or 7 for £1			956 7/6 each or 3 for £1			
2X2	7/6 each or 3 for £1			12SF7 10/- each or 3 for £1			
6AC7	2/11 each or 8 for £1			1625 5/- each or 5 for £1			
6C4	5/- each, or 5 for £1			CV66 (RL37) 5/- ea., 5 for £1			
6H6Gs	£1 a dozen			EA50 2/6 each or 10 for £1			
6K7G	5/- each or 5 for £1			EF50 3/6 each or 7 for £1			
6SH7GT	4/- each or 6 for £1			EF50 valve sockets, 3/6 ea.			
7C7	2/6 each or 10 for £1			RK34 5/- each or 5 for £1			
7F7	3/- each or 5 for £1			VT301 7/6 each or 3 for £1			
954, 955 5/- ea., or 5 for £1				VT127	£1 a dozen		

New Valves—VR53/EF39, direct replacement for 6U7. High gain, low noise, 5/- each or five for £1.

955/EB33 D.D. Triode, 6.3v. heater. American octal base.

Trade price 22/3. Our price: 5/- each or 5 for £1.

5BP1 5 inch Cathode Ray Tube 39/-

7BP7 7" Cathode Ray Tube 10/-

NC13A 7 inch Cathode Ray Tube (similar VCR97) 30/-

THIS MONTH'S SPECIALS

SCR522 28 volt Genemotor Power Supply	30/-
American Ampenol Co-ax Sockets (chassis type)	2/6
ARR/AT5 Connecting Cables	10/- each

BC455 Command Receiver, 6-9.1 Mc., air tested, with valves £5

APN1 Receivers, complete with valves £7/10/0

As used in A.C. Power Supply for No. 22 Set. (see page 3)

Electrolytic Condensers: 16 µF. 525v.v. (pigtail type), 2 µF.

525v. (pigtail type), 3/- each or £2/10/0 per carton of 20.

Meters—0-0.35 amp. R.F., F86 and 101 type 10/-

Crystals, mounted in DC11 holders. £1 each. Frequencies

available: 5410, 5710, 5910, 5950, 5980, 6240, 6243.333,

6350, 6420, 8488, 8525, 8630, 8645.454 Kc.

3.5 Mc. Marker Crystals, miniature, with holder £2/10/0

A.W.A. Transmitters, Mobile, freq. 33 Mc. Contains four type

6V6s, one 807 final, 6v. vibrator supply. Modulated. £7/10/0

AT21 Transmitters. Packed in case. New condition, £12/10/0

108 Mk. III. Portable Transceivers. Complete with Valves,

Headphones, Mike. Freq. range: 7-9 Mc. Bargain £7/10/0

128 Portable Transceivers, freq. range: 2-4.5 Mc. Nine minia-

ture valves (1.4v. series), 0-500 microamp. meter, Less

Crystals. Bargain £7/7/6

3BZ Transmitter, complete with valves, 12v. operation £15

AT5 Transmitters, as new, with valves & dust covers, £8/17/6

No. 19 Transceiver, complete with valves and genemotor.

No Cables £7/10/0

AT5/AR5 Aerial Coupling Units, as new £2

SCR522 Modulation Transformers 30/-

SCR322 Driver Transformers 10/-

Type "S" Power Supply. 230v. AC. Good condition £25

AT21 Power Supply, 230 volt AC. Good condition £25

Co-ax Cable, 72 ohm, 1" diam., in 10-yd. lengths £1, or 2/- yd.

Co-ax Cable, 98 ohms, in 100 yard rolls. £7/10/0 per 100

yard roll, or 1/8 yard.

Co-ax Cable, 100 ohm, any length 2/- yard

PI Type Co-ax Plugs and Sockets 4/- pair

Command Receiver Flexible Drives, 12 ft. long 10/-

Relays—522 type, 5000 ohm £1

Relays—522 type, aerial change-over £1

U.S.A. I.F.F. Units, complete with Valves and Genemotor,

£5/17/6. Less Genemotor, £4/17/6.

Car Radio Suppressors: Spark Plug type, 2/- each; Distribu-

tor type, 2/- each, or 12 for £1.

APX1 24v. Shunt Motors, ideal for Small Beams. Works

on A.C., new £1/10/0

APX1 Chassis, top deck, containing 28 Miniature Ceramic

7-pin Valve Sockets, Condensers, Resistors, etc., etc. A

good buy at £1/15/0; postage 5/- extra

Local Valve Sockets 1/- each

Valve Sockets, Acorn Ceramic 3/6 each

ALL Q-PLUS T.V. CONSTRUCTORS PARTS READILY AVAILABLE

3" Coll Formers, Plastic, with Tuning Slug 1/- each

3" Coll Formers, Plastic 6d. each

Midget Ceramic Trimmers, 3 to 55 pF. 1/-

A.W.A. B.F.O. Type 4077, 10 cycles to 13 Kc. A.C. operated.

Condition as new £25

A.W.A. Valve Voltmeter, 1.5v. to 150v. A.C. operated, £15

Three inch Speakers, well known make, new in carton, less

transformer £1 each

English Filter Chokes, small type, 40 Ma., 160 ohm resist. 3/6

Shielded Wire, single, American 1/6 yard

Power Transformer, small, 255v. aside 60 Ma., 6.3v. 2.8 amp.

200-225-250v. primary. Brand new 25/-

Transformers, potted, 6.3v., 5v., 385-0-385v., 125 Ma., 45/-

American 4 mid, 1000v. Condensers 7/6 each

Miniature Variable Condensers, screwdriver adjustment, sil-

ver plated. Sizes available: 25 pF., 55 pF., 80 pF., 105 pF.,

or 110 pF. New condition. 7/6 each or Three for £1.

Two-Gang Condensers, Broadcast 12/6

Three-Gang Condensers, AR5 High Frequency Type 15/-

Four-Gang Condensers, approx. 150 pF. per section 15/-

1958 Call Books now in stock, 5/- Also Log Books, 4/6.

AMATEUR RADIO

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

EDITOR:

R. W. HIGGINBOTHAM, VK3RN.

TECHNICAL EDITOR:

K. E. PINCOTT, VK3AFJ.

PUBLICATIONS COMMITTEE:

G. W. BATY, VK3AOM.

G. BILLS-THOMPSON, VK3AHN.

S. T. CLARK, VK3ASC.

J. C. DUNCAN, VK3VZ.

R. S. FISHER, VK3OM.

V. M. JONES, VK3YE.

J. G. MARSLAND, VK3NY.

ADVERTISING REPRESENTATIVE:

BEATRICE TOUZEAU,

96 Collins St., Melbourne, C.1.

Telephone: MF 4505.

PRINTERS:

"RICHMOND CHRONICLE,"

Shakespeare St., Richmond, E.1.

Telephone: JB 2419.

MSS. and Magazine Correspondence should be forwarded to the Editor, P.O. BOX 36,

EAST MELBOURNE, C.2, VIC.,

on or before the 8th of each month.

Subscription rate in Australia is 18/- per annum, in advance (post paid) and A£1/1/- in all other countries.

Wireless Institute of Australia
(Victorian Division) Rooms' Phone
Number is JA 3535.

WI BROADCASTS

All Amateurs are urged to keep these frequencies clear during, and for a period of 15 minutes after, the official Broadcasts.

VK3WI: Sundays, 1100 hours EST, simultaneously on 3575 Kc., 7146 Kc., and 146.0 Mc. Intra-state call-backs taken on 7090 Kc. only at present.

VK3WI: Sundays, 1130 hours EST, simultaneously on 3575 and 7146 Kc., 51.016 and 146.25 Mc. Intra-state working frequency 7138 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

VK4WI: Sundays, 0900 hours EST, simultaneously on 7146 Kc., 14.943 Mc. and 36.172 Mc. Country hook-up Sunday mornings 0900 hours. Please call VK-42M on 20 mx and Bruce VK4ZBD on 9 mx.

VK3WI: Sundays, 1000 hours EAST, on 7146 Kc. Frequency checks are given by VK3MD and VK3WI by arrangements on all bands to 56 Mc.

VK4WI: Sundays, 0900 hours WEST, on 7146 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

VK3WI: Sundays, 0830 hours EST, simultaneously on 3596, 7146 and 14543 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

Published by the Wireless Institute of Australia, Victorian Division, 478 Victoria Parade, East Melbourne, C.2.

Postal Address: P.O. Box 36, East Melbourne, C.2, Vic.

EDITORIAL



THE LUST FOR DX

"DX IS all right. To desire to work the ends of the earth is a laudable ambition. We know, because we ourselves went through it. To be the first to work a new country is to enjoy a terrific new 'kick'. We know that, too, for we had the honor of being the first to click with a couple of countries. And to have a transmitter so good that one doesn't have to content oneself with modest ranges but can go after the most distant station that can be heard is no more than the normal desire of every normal Amateur.

"But when this craving for DX reaches the proportions of an obsession, when it blinds its possessor to the realisation that there are other forms of Amateur activity, it is just as bad as any other form of intolerance. Amateur Radio is suffering today because the hunger for super-distance contact has become a lust which has almost killed short range, friendly, casual contacts. This business of friendly contacts with one's own radio neighbors is really the most important thing in the game. It was what built up the wonderful spirit of the Amstere body; it was this camaraderie of the air which cemented all Amateur Radio in the splendid solidarity which our 'old-timers' remember with a sigh. Today it is precious near gone. We have

sounded the warning before. If we don't look sharply now, the most potent thing in the Amateur fellowship will be beyond our recall.

"The old-timers 'wonder what's the matter'. We've been wondering, too, and we believe that this is it. Is the gentle art of radio operating a more bloodless and a less human and enjoyable matter than it used to be? If so, let us remember that we make the game ourselves, and that we have it in our power to make it anything we wish. A warm fellowship of kindred spirits or a cold and cheerless world.

"The moral in this for the operating Amateur is simple: be more human; learn to talk; use your station as an instrument for the cultivation of friendships; give heed to the spirit of Amateur Radio, and learn that there is something in the game far more precious than the eternal hollering for QSL cards."

The above extracts from the Editorial of "QST", May 1926, appear to us to be equally applicable in April 1959. However, the expanded fields of experimentation now open to the Amateur means that the exchange of valuable technical information during these friendly local contacts far outweighs the call of DX.

FEDERAL EXECUTIVE.

THE CONTENTS

Solid State Radio Frequency Amplifiers—Part One	3	Three-Band Converter	19
Simple Sideband—Parts One and Two	5	Hints and Kinks—	
CQ, CQ, CQ Australian Amateurs	9	Audio Test Tone	21
1938 VK-ZL DX Contest Results	13	Shunt Coupled Pi-Couplers	21
National Field Day Contest, 1959, Results	14	Fibre-Glass Whips	21
Prediction Chart, April, 1959	14	Portable Antennae	21
Short Wave Listening	16	Awards: Moorabbin and District Radio Club	21
Meet the Other Amateur and His Station: Ron Hugo, VK6KW	17	For Fit Persons Only!	21
Cyclone "Connie" Visits Queensland	17	DXCC Listing	21
Technical Article Award	17	DX International Interest in British I.R.E. T.V. Convention	22
Amateur Call Signs	18	VHF	22
		Correspondence	24
		Notes	25
		Contest Calendar	25

HAMS! HAMS! HAMS!

THE NEW 1959 EDITION OF THESE EVER POPULAR HANDBOOKS ARE NOW AVAILABLE.

RADIO HANDBOOK (New 15th Edition) 1959

Published by Editors and Engineers—Arriving March.

PRICE: 85/6 plus 2/6 postage.

RADIO AMATEURS HANDBOOK 1959 Edit.

Published by American Radio Relay League—Arriving April.

PRICE: 46/3 plus 2/- postage.

These fast moving Handbooks, written in a non-technical language, are a MUST item for Engineers, Amateurs and Radio Enthusiasts.

ORDER YOUR COPY NOW FROM . . .

McGILL'S AUTHORISED NEWSAGENCY

Est. 1860

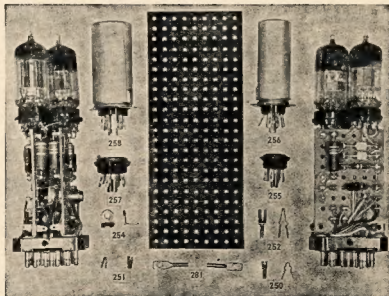
183-185 ELIZABETH STREET, MELBOURNE, C.1, VICTORIA

"The Post Office is opposite"

Phones: MY 1475-6-7

REDUCE THE SIZE AND COST OF YOUR NEW EQUIPMENT

TYPICAL
UNITS
USING
ZEPHYR
MATRIX
SYSTEM



Leaflets and
Price List available
from all
leading Wholesalers.



Enquiries invited
from
Manufacturers.

ZEPHYR PRODUCTS PT. LTD.

58 HIGH STREET, GLEN IRIS, S.E.6, VIC.
Phones: BL 1300, BL 4556

Solid State Radio Frequency Amplifiers

PART ONE

C. S. RANN,* VK3AAK

OVER the last few years there has been an increasing interest shown in non electron tube amplifiers in the u.h.f. and microwave regions of the spectrum. These amplifiers are usually described as "solid state amplifiers" because the active component is usually some inorganic compound such as germanium metal or ruby. Whilst the modern technical literature on these amplifiers makes rather difficult reading, the basic principles are not new and a clear description of the mode of operation of the amplifier can usually be had by referring to the original research papers. It is the purpose of this article to give a description of two of the lesser known solid state amplifiers and to provide literature references for any experimenters who wish to make a study of the subject.

The three most discussed solid state amplifiers at present are: (1) The transistor, (2) the maser, and (3) the parametric amplifier or mavar. I feel that the transistor applications to radio frequency amplifiers have been described adequately in the popular literature and are easily available, so this article will deal with simple descriptions of the maser and parametric amplifier.

Superficially these two amplifiers are very similar. Each amplifier has low noise, limited by the thermal noise of the electrons in the amplifier input circuit. Both amplifiers obtain their gain by simple regeneration at the frequency of the desired signal, and will oscillate if too much regeneration is applied. In both cases the amplifier obtains the power required for regeneration from a separate oscillator called a "pump oscillator" which oscillates at a frequency different from that of the signal. Finally, both amplifiers are narrow band width devices as perhaps would be expected from a regenerative type of amplifier. Their claim to serious attention is that they are capable of giving high gain at low noise, and indeed they theoretically should be far superior to a thermionic electron tube as these amplifiers do not have flicker noise, induced grid noise, shot noise or partition noise. In the case of the maser, the amplifier works at liquid air temperatures and has such a low noise figure that it approaches the theoretically perfect receiver.

The explanation of the working of each amplifier is, however, quite different, although one may suspect that a more fundamental connection, whilst not yet apparent, possibly exists. The maser depends on the electrons in a substance giving up their energy in the form of a radio wave. Actually the electrons surrounding the atoms in the maser absorb energy at the pump frequency and re-emit energy at the signal frequency. The parametric amplifier, on the other hand, depends on the non-linearity existing between the terminals of a reactance. If two frequencies are fed into this reactance an infinite series of sum and difference frequencies result; it can be shown that

if certain of these resulting frequencies are made to supply power to a tuned circuit, a negative resistance characteristic will appear at another frequency which can be made the signal frequency, hence giving regeneration. The extent of regeneration can be controlled by the power of the pump oscillator.

THE MASER AMPLIFIER

The name maser for this amplifier comes from "Microwave Amplification by Stimulated Emission of Radiation." A description of the maser is impossible without delving into the physics of the atom, in particular the physics of the electrons which surround the nucleus of the atom. It is assumed that most readers will have an elementary knowledge of atomic processes, however in writing the following description, the aim has been to keep the discussion on this aspect to a minimum, giving only the essentials. If because of this it is found that some details are not clear or that further information is required,

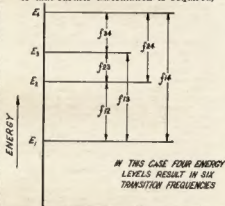


FIG. 1. ILLUSTRATION OF THE FREQUENCIES IN A SERIES OF FOUR ENERGY LEVELS

a bibliography has been included, the references of which will supply further details on the different types of masers.

A useful analogy to the maser is the phenomena of fluorescence. When ultraviolet light falls on some types of chemical crystals they will fluoresce, giving off light visible to the eye. Light is an electromagnetic radiation identical with radio waves except for frequency. In the case of fluorescence the crystal absorbs energy at the high frequency of ultraviolet light, and re-emits this energy at the lower frequency of visible light. The maser does exactly this but at microwave frequencies.

To understand the absorbing and re-emitting processes, we must consider the many electrons associated with the nucleus of the atom. These electrons exist at different energy levels, usually described as different orbits around the nucleus. These energy levels, however, are discrete quantities and if an electron were to absorb energy it would jump to a higher level; it would not

just gradually increase in energy. This principle was originally stated in the "Quantum Theory" and the small increments in energy are called "quanta". This theory provides the relationship between the energy and the frequency of electromagnetic radiation associated with the jump of an electron from one level to another.

$$\text{Frequency } (f) = \frac{E_2 - E_1}{h}$$

where E_1 is initial energy.

E_2 is resulting energy.

h is a constant value called "Planck's Constant" after one of the pioneer scientists of the quantum theory.

This formula is applicable for both absorption and emission of energy. For a radio wave to be absorbed by a substance it must be of such a frequency that the above formula is obeyed, similarly the same equation predicts the frequency of the emitted radio wave when an "excited" atom returns to the normal or equilibrium state. Reference to Fig. 1 will show some energy levels and the frequencies (f) associated with these levels.

If there are many energy levels in an atom it becomes apparent that energy can be absorbed at any of the lower levels and be re-emitted at many different frequencies, as shown in the example used in Fig. 1. Energy differences corresponding to visible light would be about one electron-volt. The energy differences for microwave frequencies would be much smaller, about 10^{-4} to 10^{-3} electron volt. A v.h.f. signal, say 100 Mc., would correspond to an energy difference of 4×10^{-7} electron volt.

There are three possible ways an electromagnetic wave can interact with the electron energies of an atom. These are: (1) Absorption, (2) Spontaneous Emission, and (3) Stimulated (or Induced) Emission. "Absorption" is the process whereby the electrons in the atom are given extra energy and put into higher levels. Compounds show absorption bands, thus for absorption to occur the frequency must be within this band. In the case of light we have a coloured solution. When white light of many frequencies falls on one side of the bottle, and passes through to the other side, absorption of some frequencies occurs during transit, and the light emerging at the other side is coloured, hence the colour of the solution is that of the light which has not been absorbed. In the case of the maser the energy of the pump oscillator is absorbed in order to get the atom in an excited or unstable state. "Spontaneous emission" occurs when electrons are falling to lower levels without requiring any further energy from outside the effect. The process of spontaneous emission is practically non-existent at microwave frequencies. "Induced" or "Stimulated Emission" is the triggering of the release of energy at a high level to a lower level. An electromagnetic wave of low power can serve to release this stored-up energy. In the case of

* 2 Georgiana St., Sandringham, Vic.

the maser the received signal is used to do the triggering, the electrons having first been placed in the higher level by the atom absorbing energy from the pump oscillator. This "molecular energy" released by the signal is coherent with the signal, i.e. the phase is related directly to that of the signal.

In the microwave region the actual energy transitions are due to changes in the "spin" of the orbiting electrons. The energy changes when electrons change orbit as previously described are much greater and result in the emission of visible light. If an electron spins about an axis through its centre it creates a magnetic field. If the electron field is at an angle to the applied field a force will be exerted on the electron tending to rotate it into line, just as a compass needle will line up with an applied field. The electron, in changing its spin direction, causes an energy change which will still maintain discrete quantum increments. The electrons in an atom occur in pairs, any two electrons in a pair are identical except that they have spins in opposite directions. Sometimes, however, an atom can have an odd electron that has no matching electron of opposite spin. As the field from each pair of electrons cancel, an atom with no unpaired electrons has zero field. Any unpaired electrons give an atom a residual field and it is said to be "paramagnetic". The maser to be described in this article is a "Three level paramagnetic ion maser". An ion is an atom which has more electrons than it should have to be neutral. Copper metal for instance has neutral copper atoms, but a blue copper sulphate crystal contains copper ions which carry a positive charge due to a lack of electrons.

When many atoms are assembled into a crystal their energy levels, which were previously discrete quantities, become broken up into many sub-levels due to mutual interference of the atoms with each other. See Fig. 2. This can lead to an apparent continuous energy distribution and this state of affairs must be suppressed in the case of maser operation. This is achieved by taking paramagnetic ions and putting them in a crystal of neutral atoms which are not showing any tendency to react with a field. In this way the ions are kept apart and because no mutual interference occurs they can maintain discrete energy levels. An example will be given later of the type of system used.

The next point to consider is the practical difficulty of exciting the maser to emit energy. It is one of the major difficulties at the present time and many methods are used. In the case of the three level maser which will be described, we have only two energy levels (see Fig. 2). The electrons must be driven up to the higher level at a microwave frequency (f_0), the electrons may then fall back to lower levels, emitting radiation at the microwave frequencies f_0 or f_1 . Therefore the pump frequency would be f_0 and the maser could be made to amplify at either f_0 or f_1 .

Two important practical considerations should be discussed at this stage. They are known as "relaxation time" and "saturation". Relaxation time is virtually a measure of the time an electron will stay up in the energy level E_2 , before falling back to the lower

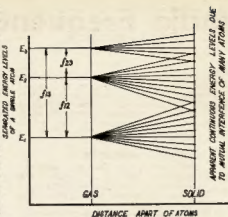


FIG. 2. THE SPREAD OF ENERGY LEVELS WHEN PARAMAGNETIC IONS ARE TOO CLOSE TO EACH OTHER

levels. If the electrons fall back quicker than they can be put up there, the maser will not work. Unfortunately, not many compounds have relaxation times greater than a microsecond, and it is very difficult to find a method of exciting the maser in the period of the relaxation time. This severely limits the number of compounds that can be used in masers and also affects the operating conditions of a maser. In the case of the maser described here the method of excitation requires a long relaxation time of about 10^{-4} second. Such relaxation times can only be obtained by lowering the temperature of the crystal to that of liquid helium. Great efforts are being made to find a crystal which will work without this requirement, however the low temperature does lead to an extremely good noise figure.

"Saturation" is the decrease in efficiency of the maser which occurs when the excitation energy has become too strong. The saturation power is well under one watt and in some cases can fall to 10^{-10} watt, hence it is obvious that the maser is a low power device, however this need not be a disadvantage for use as a receiver.

The following example may serve to illustrate the practical requirements of a maser. In this case a crystal of hydrated lanthanum ethyl sulphate was used. Some (1%) of the non magnetic lanthanum ions were replaced by paramagnetic gadolinium ions. The crystal was placed in a cavity, hence positive feedback was possible, and regeneration could occur. It is of course easy to obtain high gain with a regenerative amplifier, but as always the selectivity becomes high, i.e. a narrow bandwidth. In masers this is very serious because the low power available from the atoms requires considerable positive feedback, hence the maser must operate near the point of oscillation and instability difficulties are always present.

The crystal in this example was placed between an electromagnet applying a d.c. field of 2850 gauss. This can virtually tune the frequency of the maser by altering the height of the energy levels. The maser was then immersed in liquid helium. The cavity was

tuned to two frequencies, $f_0 = 17.5 \times 10^9$ Mc., and $f_1 = 9 \times 10^9$ Mc. A microwave oscillator at f_0 was coupled to the cavity and the signal power was available at frequency f_1 . When the power of the pump oscillator was increased the coupling loss and the wall loss at the signal frequency of 9×10^9 Mc. gradually diminished until a point was reached when the emitted power at the signal frequency equalled all of the losses in the system. Past this point the maser broke into oscillation. The strength of the oscillations increased as the pump power was raised further. Fifteen microwatts of power at 9×10^9 Mc. was observed for 200 milliwatts of 17.5×10^9 Mc. pump power. At pump powers of 60-95 milliwatts, the emitted radiation was enough to compensate for most of the wall and coupling losses, hence the maser operated as an amplifier.

In Fig. 3 is shown a system for a low noise receiving station. The maser used with a crystal mixer are both low noise solid state devices. The circulator is a microwave trap which controls the direction a signal may pass in coming from the aerial to the mixer, the direction is given by the arrow, and the signal may pass from one quadrant to the next in this direction.

In concluding this description I would like to point out that there are many interesting applications of masers which I have not mentioned. The "atomic clocks," which are the most precise frequency standards known at present, are very simple types of masers using ammonia gas (in one case) and do not require any cooling to liquid air temperatures. There are also many other ways of exciting and operating a maser, however they all work on the same fundamental principles described here. The example given in this article is possibly the most likely type to be used as a receiver because it is tunable, many maser systems only work on given set frequencies.

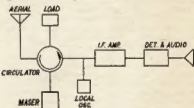


FIG. 3. SUGGESTED MASER RECEIVER

BIBLIOGRAPHY

GENERAL READING:

1. "New Approaches to the Amplification of Microwaves," J. F. Whitte, R.C.A. Review, Dec. 1957, p. 441.
2. "Molecular Amplification and Generation of Microwaves," J. F. Whitte, Proc. I.R.E., March 1957, p. 291.
3. "The Solid State Maser," J. W. Meyer, Electronics (engineering edition), April 25, 1958, p. 65.

ARTICLES ON SPECIFIC ASPECTS:

4. "Cesium Time Standard," Mainberger, Electronics (engineering edition) No. 45, Nov. 1958, p. 90.
5. "The Maser—New Type of Microwave Amplifier, Frequency Standard and Spectrometer," J. P. Gordon, H. J. Zeiger and C. H. Townes, Phys. Rev. 95, 1954, p. 252; Phys. Rev. 96, 1955, p. 1294.
6. "Proposal for a New Type Solid State Maser," N. Bloembergen, Phys. Rev. 104, 1956, p. 234.

(Continued on Page 18)

SIMPLE SIDEBAND*

PARTS ONE and TWO

LESTER EARNSHAW, ZL1AAX

THIS article is intended as the first of a series delving into the supposed mysteries of Single Sideband. But so that it may be of interest to those who are not "sideband happy", they will also contain information which is applicable and useful to those who subscribe still to the a.m. technique. But above all, they will not be technical more than is absolutely necessary; there will be no maths and there will be practical articles from which any Ham can build an s.s.b. rig. First though, there are various theories and concepts which are not all what they might be, and if you are going to get a rough idea of what s.s.b. is about, it is good that you start off on the right foot and clean out the storehouse of knowledge of that which is misleading. So let's get out the broom.

The following are all pertaining to a.s.b. and the reason for the telling will appear later. The immediate following will also be of interest to the a.m. man. I begin by discussing carriers.

"Is my carrier narrow?" is a question you often hear asked. Or, "I checked your carrier and it's really nice and narrow" . . . etc. But a carrier has no width. If my carrier appears wide on your receiver it is because your receiver is broad! Now don't cut down my antenna—wait until I finish. A carrier has no width. This is fact. How can a carrier be on 3.8 and 3.7998 at the same time? It can, of course, if it has parasites. Then it'll probably be on 100 mega as well. It's like the old story, how wide is a point? The carrier is less than a point. The width of a carrier is a measure of your receiver selectivity. A Collins 75A4 will make it quite a lot less than a ZC1 or a crystal set for example.

Now, having disposed of that one, let's discuss modulation. The books say that modulation is the process whereby the amplitude of the transmitted wave is varied in accordance with the waves impinging on the microphone. Fiddlesticks! Modulation is nothing of the sort. How can one convert amplitude of a voice, and frequency of a voice, both to amplitude modulation? How does one sort out which variation is frequency and which is amplitude at the receiver? What we really do is generate new carriers at the sides of the main carrier! And I'll prove that.

Big yourself up a tone osc. of say 2000 cycles and modulate a low power exciter with it. Put the receiver on and turn on the crystal filter to its sharpest position. If you tune across the tone modulated signal and if your filter is sharp, you will pick up three carriers. None will be modulated by a tone! If there is tone modulation you are receiving more than one of those carriers. One is beating against the other and producing a third—the tone. You won't be able to make this test with a crystal set. As incidentally, the tone must be a pure sine wave or else the harmonics will beat with each other and produce a tone. Modulation is a process which

● Upon request it has been decided to reprint a series of articles that appeared in "Break-In" last year explaining sideband operation to the Amateur who has not, till now, delved into this most interesting mode of transmission. Later it is hoped to publish some articles on the practical side of sideband operation from VK Amateurs.

produces new carriers at each side of the main carrier.

This is not f.m. F.m. varies the main carrier about its datum line. A.m. produces new carriers, removed in frequency to plus and minus value, from the main carrier. Of course there are some who manage to combine the two, f.m. and a.m., but they're smarter than I am.

S.s.b. means that the main carrier and the bunch of carriers out one side have been removed. In other words, you have suppressed the carrier and one sideband. If you like you can remove one sideband but leave the carrier and the average fellow won't know the difference from a.m. This is because the carrier (assuming our tone modulation again) is beating with the sideband and producing the tone. If both sidebands are there the tone will be louder because each is beating with the carrier and the results are adding together. But they will only add together if the phase is correct. You know what happens when you get phase distortion through atmospherics gumming up the process of propagation and reception. The same thing happens when you endeavour to transmit double sideband without carrier. Unless you get that little old carrier back in the correct phase, brother you have trouble. So the answer is, get rid of one sideband.

Now I have inferred that the results will not give as many S units on the receiver as double sideband and this would normally be correct were it not for the fact that removing one sideband leaves a little more room in the final to accommodate more of the one sideband that is left. You give the final half as much work to do so you make it work twice as hard! More or less. I could prove this not quite right, but I said I would not use maths. It's near enough.

Near enough for the purpose of explanation is the following: You have a 100 watt a.m. rig. 86 watts of that input is used up making that little old carrier. 164 watts goes into one sideband and 164 goes into the other. If you own a 75A4 with the 3 kc. filter aboard, you get the 164 watts of whichever sideband you are listening to. If you're using a ZC1 you get the 33 watts. But if you're transmitting 100 watts of single sideband you're getting the 100 watts. Now you know one of the reasons I sold the a.m. outfit.

I did use a few figures just then. We'll try a metaphor. For some reason or other which I won't enter into for fear I got locked up, I wish to convey movement from one side of a lake I have on my property, to the other side.

I climb down the bank on this side and whack—hang out of the water with an oar. Ripples flow across the lake—right over to the other side—and shake about a float which I had previously put there and so wave a flag or ring a bell or otherwise indicate that I should be locked up. That little old lake is 100 feet deep. It's too deep. I might drown, so I shift camp. Now the lake is a foot deep. Has it made any difference? No, it hasn't. It'd still work if I ran across with a basin full underneath each ripple so long as I didn't get stuck in the mud. That water is our carrier, the ripples the sidebands. Actually in s.s.b. we even go one better. We take away all the water and only put it back at the other end when the ripples arrive. There are other reasons for using s.s.b. but they will make themselves more apparent later.

Removing the carrier is simple. If you get a push-pull r.f. amplifier and connect the plates of the two tubes in parallel you will suppress the carrier. This is the same as a push-push circuit save that the coils in the grid circuit are tuned to the same frequency as the plate. The two plate currents flowing in opposite directions cancel each other out. But if you would modulate this suppressed carrier you merely need to modulate in a parallel mode. If you modulate in a push-pull manner, you will cancel out the modulation. You've probably seen the set-up ("A.R." Aug. 1937) which converted a A.M. transmitter to do the job. It is very simple.

Just to be different, the s.s.b. boys call this a balanced modulator. There are other forms of it which we'll meet later, but they work in the same manner.

You may remove the sideband merely by pushing the signal through a sharp crystal, mechanical or inductive filter. Or alternatively, by judicious phasing, shifting of the carrier and sidebands you may cancel out one sideband in a manner somewhat similar to the way you cancel out back radiation from a beam antenna.

Both methods are cheap and simple. Only the lack of familiarity makes them appear frightening.

Now I will deal with receivers and explain why it is s.s.b. signals are "hard" to tune in, how to make them easy to tune; why it is s.s.b. signals do appear to take up half the band on many receivers, and how various adaptors work to make tuning easy.

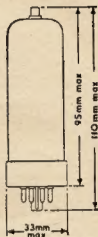
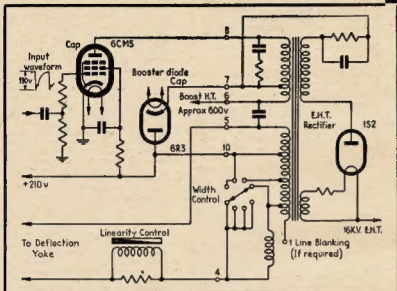
HOW TO COPY S.S.B.

The reception of s.s.b. signals is perhaps the most difficult part of the whole s.s.b. business unless of course you possess one of the commercial receivers designed for this job. Make the reception side of s.s.b. easier and there will

* Reprinted from "Break-In," April, May, 1968.

Mullard TELEVISION VALVES

6CM5
LINE OUTPUT
PENTODE



6CM5 CHARACTERISTICS

Heater ratings

6.3V at 1.2A

TYPICAL OPERATING CONDITIONS 90° DEFLECTION

Anode Voltage Supply (alternative Voltages)	200V	225V
Anode Voltage Boost	460V	472V (Approx.)
Total D.C. Supply	660V	690V (Approx.)
Screen Grid Voltage	200V	225V
Grid Input Voltage (pk to pk)	145V	145V
Anode Current (D.C.)	110mA	85mA
Screen Current (D.C.)	30mA	28mA

The 6CM5 is a television line output pentode having anode and screen dissipation ratings of 10 watts and 6 watts respectively. Peak anode voltage ratings of 7.0 kV positive and 3.0 kV negative together with a peak anode current rating of 350 mA ensure its suitability for 90° deflection systems with EHT voltages of the order of 18 kV. The reserve margins available ensure long service life. Additional data is available to design engineers on request.



ISSUED BY THE TECHNICAL SERVICE DEPARTMENT

MULLARD-AUSTRALIA PTY. LTD., 35-43 CLARENCE ST., SYDNEY, BX2006, & 592 BOURKE ST., MELBOURNE, MU2346
ASSOCIATED WITH MULLARD LTD., LONDON, MULLARD EQUIPMENT LTD., MULLARD OVERSEAS LTD.



Octal Base

M6TX

be few people left on a.m. This is no wishful thinking on my part but actual fact being borne out right now in the United States where receivers are being designed first for s.s.b. a.m. being almost an afterthought. For those who are sceptical, remember that almost all Government services throughout the world are changing over to s.s.b. I can't see Governments spending large amounts of money for the hang of it.

There are various ways and means by which you may improve the reception side of things, but first I must stress the most important facts of all. **Your receiver must be stable.** If your receiver is not stable and you are not prepared to do anything about it, you had better forget the whole business. Your receiver must stay stable. And, equally important, **you must have a slow tuning rate on the receiver.** Remember now, you need to tune in with only cycles error. Once you have mastered this you will find the a.m. standards of stability shocking to an extreme. Begin with the front end osc., not the b.f.o. Usually it is the front end osc. that is the culprit re stability because (a) it works on a higher frequency and (b) it has switched circuits and various non-high stability components in its make-up. And (c) it may be a combination tube in which case it is subject to a.v.c. variations and also heat from its fellow. (d) The mechanical stability is poor.

Dealing with the last (d), the answer there is obvious. If you can't get this better, the original design being poor, you had better scrap the project and begin again. Just as the t.r.f. became obsolete, so now is the conventional superhet. doing the same way. Today's standards are high. Assuming you are able to make the osc. section rigid so that it may be lifted when the b.f.o. is on without causing more than a few cycles' change in note, when the note is a low one—say 50 cycles—you are in business. Now stabilize the local osc. and b.f.o. power supply with a V.R. tube. The lower the voltage the better. Next, replace any condensers around the osc. sections with high grade micas. Make certain resistors are not cooking; they should be of such ample rating that there is no heating whatever. Disconnect the a.v.c. from the mixer tube if it is a combination tube. Keep the heat away from the local osc. and b.f.o. components.

Now to a discussion on that ticklish subject s.s.b. splatter. It is unfortunately an inescapable fact that s.s.b. does cause splatter in many receivers. This though is not necessarily the fault of the transmitter. In fact I have no hesitation in saying that most of the s.s.b. signals on the air in this country are good ones. There are a few poor sigs just as there are in a.m., but usually they are building phases and are soon put right. The s.s.b. boys usually take care to mention to one of their fellows whenever he is splattering.

Splatter in the receiver, that was not transmitted, may be due to the following: Overload of the receiver a.v.c. This is a very common cause. What happens is that the time constant of the receiver is not able to cope with the shotgun bursts that are speech and as a consequence the receiver is just as overloaded as it would be on an a.m. signal with the r.f. gain right up and

the a.v.c. off. If your a.v.c. won't work then you must resort to the manual a.v.c.—namely, the r.f. gain control. On the 75A4 even, one has to turn down the r.f. gain to copy s.s.b. You must cut the legs right off that s.s.b. signal until it fits the receiver. If in doubt, turn the audio gain right up and use the r.f. gain as a loudness control. Incidentally, quite magically, you'll now find that signals are easy to tune.

Splatter at the receiver may also be caused due to lack of b.f.o. injection. If you don't put back enough carrier, you over-modulate the signal in your own receiver (and most likely blame me). The answer here of course is to increase the b.f.o. injection and as above keep down the r.f. gain.

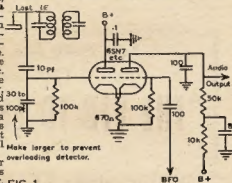
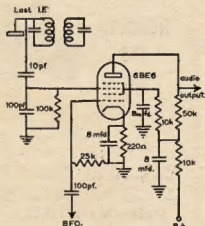


FIG. 1. This product detector is fitted to many American receivers, and is an excellent performer



A conventional mixer circuit is a product detector as can be seen here.

And now, if you spend a little time on the tuning rate of the receiver, either by mechanically bandspreading it or alternatively by say adding a small trimmer across the local osc., you're going to be able to read s.s.b. just as you would a.m. As a guide, my own receiver has two tuning rates. One, the slow rate, takes 125 turns of the knob to cover the band 3.5 to 4.5 megs. and the other 25 turns. This I would say is an ideal rate. The three-gang condenser with its associated worm from an ARCS receiver (Command), when bandspread to cover one band,

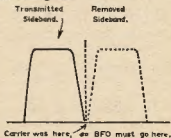
gives a nice tuning rate. If you are not able to get a tuning rate approaching this, then tuning s.s.b. will always be a hectic sort of business. When an s.s.b. signal sounds like an a.m. station and tunes in without fuss or hesitation, only then are you doing the job correctly.

Many people think that a product detector is the end-all to s.s.b. copy, but without the essentials mentioned above, it is useless. A product detector is just a fancy name for a mixer or a converter. There is little difference between a product detector and the mixer in the front end of your receiver. In this case the b.f.o. is the local oscillator and the r.f. frequency is the audio range. All other constants and component values may be the same. Just bear in mind though that coming at the tail end of the i.f. strip instead of the beginning, there will be so much gain the detector will more than likely be overdriven.

Fig. 1 shows the circuit of a cathode follower type product detector that is used in many American receivers.

There are two main advantages in using product detector. (a) The injection voltage from the b.f.o. is no longer critical as with the diode detector, and (b) there will be less QRM because the output will only occur when the signal beats with the b.f.o. A measure of whether or not the detector is functioning correctly is to turn off the b.f.o. when the output should be negligible. If there is output possibly the input is too strong and rectification is taking place on the grid. A.m. signals to one side will appear as duck talk which does make it far less annoying and also explains why it is a s.s.b. station often has trouble copying an a.m. station who breaks in on the channel a little off zero beat. Only if he is zero beat will his speech be readable.

There seems to be considerable confusion regarding the correct tuning of the b.f.o. The correct procedure depends to a certain extent upon the selectivity of your receiver. If the receiver is broad, it is probably better to set the b.f.o. to the centre of the pass band. But for a sharp receiver this is certainly not the case. With the b.f.o. off, put the receiver in a very sharp position and tune for maximum loudness of the duck talk. Only then, turn on the b.f.o. and clear the speech. If that position is marked that will be the position to which you should always set the b.f.o. for that particular sideband. For the other sideband there will be a position exactly opposite. As a general rule stations on 80 metres operate on lower sideband, but on 20 metres the reverse is true. There should not be need to fiddle with the b.f.o. control. All tuning should be done with the main tuning dial.



Carrier was here, BFO must go here.

Another method of reception which has considerable merit when the receiver stability and tuning rate is poor is the method known as front-end inductance where a frequency meter or other stable osc. is used to supply the carrier. With this the a.v.c. may be left on and the station tuned as for ordinary a.m. once the frequency meter has found the station. This method does give a little trouble with stations of varying strength, but on the other hand does allow you to tune the band without having to retune the s.s.b. signal. It is, though, at the best, a cumbersome method and this will be brought home very fully once you have tuned a decent receiver using the other method.

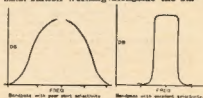
There is one further point which deserves ready mention and which mainly the s.s.b. boys seem to fully realise, and that is one of selectivity. 3 kc. is all that is necessary to copy any good a.m. or s.s.b. station. More than half the a.m. stations I listen to suffer with f.m. and therefore are a problem. By turning on the b.f.o. and listening to the one sideband only you will find weak signals considerably improved in copy so long as there is no f.m. present. And if the receiver is sufficiently sharp you may remove the carrier and reinsert your own as you would for s.s.b. and also flick from one QRM'd sideband to the other where copy may be better. This is known as selectable sideband reception and on modern receivers using what is known as a slicer or narrow passband may be effected merely by turning a knob or pressing a switch.

The low frequency ARC5 (or BC453) is readily converted for selectable sideband reception whether for a.m. or s.s.b. Copying a.m. with the b.f.o. on is known as exalted carrier. A.m. stations will find these methods of great advantage when copying weak signals down in the noise or affected by phase distortion. It is often of great advantage to make an s.s.b. signal of the a.m. signal right in the receiver and then of course reinsert the carrier with the b.f.o. The b.f.o. will be steady and the phase immaterial. Many dihard a.m. stations, though, were they to hear themselves unwittingly delivering duck-talk would no doubt give up Ham Radio altogether.

A word about selectivity. A.m. and s.s.b. stations, in the light of crowded band conditions and the advent of s.s.b., should make every endeavour to get 3 kc. selectivity in their receivers. This is, of course, quite a tall order,

especially when it is considered that to be of use, the receiver must also have good skirt selectivity. That is, you must be either tuned to the station or not tuned to it. There should not be a position where the volume falls off as you tune yet the copy remains near perfect.

Poor skirt selectivity means that the s.s.b. station working alongside the sta-

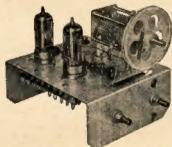


tion you would copy will work your a.v.c. and generally play havoc with the receiver. You of course will blame the transmitter, yet on a good receiver it is often a surprise to find that it is possible to fit in another station between the two and without actually overlapping. With good skirt selectivity it is possible for two groups of s.s.b. stations to work on the same carrier frequency, one group on the lower sideband and the other on the upper, but neither group QRming the other.

With this to think about and perhaps envy, I'll leave you till next month when I hope to begin on the generation of s.s.b., but eventually will return to the reception side of things for whatever we do on the generator is applicable to the receiver in the interests of greater selectivity.

You Have No Doubt Heard
The Saying—
"THE VFO TO END ALL VFO'S"
Well, This Is It!
ORDER NOW—AVAILABLE EX STOCK

Transmitter
VFO
Unit



MADE
IN
ITALY
BY
"GELOSO"

MODEL 4/104 V.F.O. UNIT EXCITER
Six Bands: 80, 40, 20, 15, 11, and 10 Metres

R.F. Power Output: Sufficient to drive one 807 or 6146 for phone or c.w. **Valve Line-up:** 6CL6 oscillator, 5763 driver.

This is an oscillator-exciter of high stability, because of the conveniently selected C/L ratio and the 6CL6 oscillator tube employed.

Price £10/19/6 including Sales Tax. Valves extra.

Also available is Model 4/103 VFO. Frequency Range: 144-148 Mc. Sufficient to drive 832 or 2E26. Valves: Two 6CL6s, one 12AT7, one 5763.

Price £12/2/0 inc. Sales Tax. Xtal & Valves extra.

PLEASE INCLUDE FREIGHT AND EXCHANGE WITH ORDERS

WILLIAM WILLIS & CO. PTY. LTD.

428 BOURKE STREET, MELBOURNE, C.1

Phone: MU 2426

Established 90 Years

**UNIFORMS
DUST COATS**

for your Office Staff, Factory,
Workshop, Servicemen.

Bowls Frocks, Tennis Frocks,
for the retail trade.

D. MILBURN & CO.

238 Flinders Lane, Melbourne

OUR FREEDOM AND AN AMATEUR FREEDOM

BY THE FEDERAL PRESIDENT OF THE WIRELESS INSTITUTE OF AUSTRALIA G. M. HULL, VK3ZS

Recently I made a tape recording, on behalf of the Federal Executive under the direction of the Federal Council of the W.I.A., which many of you heard played and re-played over the official Divisional stations of this Institute.

By popular demand, I have been requested to provide the script for publication in "Amateur Radio" so that those who were unable to listen to the broadcasts can read it for themselves. In the printed word, I shall qualify some remarks from the original recording and also add some other information which has since become available.

My prime object in arranging the recording is to place before you certain facts relating to proposals being placed before the International Telecommunications Union which could affect the frequency allocations existing at present for use by the Amateur Service, and also to say and to make known the details of the case which the Federal Executive of this Institute submitted to the Postmaster-General's Department in defence of the existing "Amateur" status of the Amateur Service of Australia irrespective of whether they belong to this Institute or not. Before proceeding to the more important part of what I have to say, let me give you a very brief outline of what the I.T.U. does in regard to the activities of our hobby and where we fit into all this business of frequency allocations and radio services.

Well before World War II, the Governments of the world, in order to make use of the behind communications facilities such as those afforded by radio methods and the power they held in their hands for purposes of speeding up the pace of the war, and also for propaganda and political transmissions to other countries. Even at this time the bands were being used in such a way that they were by most countries that something would have to be done to allocate frequencies on a world wide basis so that all services would be able to operate with as little interference to the same services in other countries as was possible.

Even in the 1930's this was a formidable task, but briefly, it was carried out by what is now known as the International Telecommunications Union (I.T.U.) and up until the outbreak of World War II, we Amateurs had retained reasonable frequency allocations and most of us were happy with what we had. Of course at the time there were less than 1,000 Amateurs in Australia, nowhere near as many transmitting services and generally-looking back at it all in retrospect—not very much to grieve about, even though the Amateur frequency allocations had been pruned at the Cairo Conference of 1935.

Well, the main function of the I.T.U. was to bring about agreements between all countries which would permit the equitable sharing of the entire frequency spectrum on an engineering basis. By this was meant a design to break the spectrum up into sections—commercial, the low end with broadcasting services on up through the shortwave spectrum with shortwave broadcasting services, maritime mobile and fixed services, and then the amateur services, and so on into the v.h.f. and u.h.f. regions.

At that place this was roughly arranged for the then existing services, but with the advent of World War II and the great impetus resulting from it in the way of advanced techniques, particularly in the case of the regions—the aftermath left complete chaos with all countries operating all sorts of services anywhere and everywhere.

As you all recall when we Amateurs were re-licensed in Australia we received most of the bands back, but a peak of time when frequencies were released from the military and other services. We never obtained the 200 metre band back, which is perhaps understandable, as it was considered like Australia with its vast areas. From memory,

I recall that there were something like 5,000 applications for broadcasting station licenses by private organisations after the war. The applications were not all fortunate, but an inspection of the frequency table today shows that not only is this job of the I.T.U. completely allocated on a basis of a 10 Kc separation between stations, but many channels are shared between geographical locations which could not normally interfere with each other's transmission.

Some of us older Amateurs regretted the loss of this band, for this was virtually the only band by which the general public knew what Amateur Radio was all about. Every few members of the general public listened to shortwaves—today hundreds of people do—and the Amateur service is recognised by them as operating in the short-wave and v.h.f. bands. Just from the interest point of view I would like to say to the younger Amateurs that this 200 metre band was not an open band for use by any licensed Amateur. Applications were granted to only a few Amateurs and they had to operate very much under broadcasting station conditions, pay royalties on all records played, keep proper station logs and records—all of which was quite a tedious business. I have wandered over my story a little here, but it is interesting to read of the earlier days in Amateur Radio. An era when there was no such thing as a licensed amateur, and they made their own equipment, even the microphone.

But let's come back to 1947 and the Atlantic City Conference of the International Telecommunications Union. This was the largest Conference ever held to determine an engineering basis for the world-wide allocation of frequencies and to make available all the services added to our way of life since the outbreak of World War II—greatly expanded airway services with their complex transmitting equipment, radar, radio range and aircraft, advanced maritime direction finding and communications equipment, larger requirements for expanded army, navy and air communications, sea and air communications; frequency channels for dozens of domestic services such as taxi-cab, radio telephone, fire-fighting communications both city and country, fishing craft and many others. All these services in 1947 which didn't exist pre-war! Without some form of International control and agreement between countries there would have been no answer to the chaos and confusion which would have resulted. I don't think I need elaborate to close our eyes to these facts. No longer can we rest on our laurels of the past as the man who pioneered the shortwave bands and began the work of the I.T.U. and all we need to do to all of us who remember the earlier days. We have to contribute something greater to the work of the I.T.U. and to the scheme of things. We shall have to contribute still greater things if we are to hold what we have today now.

And my mind then was one saving grace resulting from the 1947 Conference, and that was that the Amateurs of the world were recorded in the Minutes of that Conference as being the "Amateur Service" and the recognition of which were laid down certain specific radio regulations. Don't confuse these regulations with the international radio regulations set by the Postmaster-General's Department under the Wireless Telegraphy Act—they are a different matter altogether. It was laid down that Administrations—by this they mean the Governments of countries—would provide frequencies for the Amateur Service. I would like to quote from the Minutes of the Extraordinary Radio Administrative Conference held in Atlantic City in 1947, two regulations which set us international radio amateurs as frequency users as distinct from the category of domestic frequency users.

Regulation 56—Amateur Service: A service of self training, intercommunication and technical investigations carried on by Amateurs, that is, by duly authorised persons interested in radio communication on a personal and not without pecuniary interest.

Regulation 56—Amateur Station: A station in the Amateur Service. The regulations unquestionably record the Amateur service as an internationally recognised service for which our frequency requirements are considered on a world-wide basis.

ATLANTIC CITY CONFERENCE 1947

The case for the Amateur at Atlantic City was undoubtedly won due to the efforts of the Radio Society of Great Britain and the Amateur Radio Relay League. Australia's case was in the hands of the Postmaster-General. Delegates who were expected to protect our requirements at the same time as the interests of other commercial frequency users who conventionally could, and did, not have the same frequencies. Where then was our strength? I would say we had none! If it hadn't been for the work of the R.S.G.B. and the A.R.L.G. I doubt if there would be any Amateur Radio today. Commercial interests are not interested in Amateurs and their frequencies are to be sold. They probably give preference to them in employment where their qualifications are satisfactory, but then this is a logical procedure since Amateurs have at least partially trained the average man of some course study in pursuit of higher technical qualifications—and their natural bent for the maintenance of standards and the training of employees where they take positions in the electronic field as their pursuit in life rather than in Amateur Radio merely as a spare-time hobby.

When I say we had no "strength" at Atlantic City, I do not infer that the individual officers of the R.S.G.B. and the A.R.L.G. were not up to the mark. I mean that the average Amateur requirements. What I do mean is that the W.I.A. did not have a representative at Atlantic City and that the average Amateur of Amateur service communication requirements which are peculiar to our work and upon which we are naturally more knowledgeable.

TECHNICAL ADVANCE

After World War II, the technical advances were so great that the average Amateur was technically lagging the field, whereas in earlier days it could be said that the Amateur was technically as advanced as his commercial counterparts. No longer could the Amateur rest on his laurels as having pioneered the shortwave bands. He had to do something of more public worth than just experiment of frequencies from 80 to 15 metres. All the experience of the International Telecommunications Union fact. Certainly they afford the means of teaching newcomers the practical side of transmitting and receiving. It is a pity that the I.T.U. in 1947 the Amateurs' technical standing was meaning less and less in the ever-widening technical and reception of the bands leave a choice since has depended on the powerful case put to the I.T.U. at Atlantic City by the R.S.G.B. and the A.R.L.G.

In speaking frankly, I do not want to convey the impression that I am siding with the commercial viewpoint. Far from it. I am trying to point out a few facts and opinions which may help us to see the situation from a different angle. I am not forgetting our attitude of mind that we owned the bands first, therefore they shouldn't be able to take them away from us. But they are. Today such a defence is too weak. It is insufficient to stand in the way of progress. In Atlantic City Conference came the Frequency Allocation Table. The majority of attending nations were signatory, some with variations more lenient to the Amateur service. It was a pity that we did not agree to this agreement to the letter, which I am afraid was not the case with many other countries, as it was not possible to get over the 15 years or more has proved to us all. At this Conference we lost part of our 80, 40 and 30 metre bands. We lost the 15 metre band which has proved to be an excellent band for our use, but it hardly compensated for the losses in the 80, 40 and 30 metre bands. Do you think we lost so much when countries like America

The WARBURTON FRANKI Page

All your Radio & TV Needs

★ ★ EASIEST TERMS ★ ★

FOUNDATION KITS

Suit the R.T.V. & H. R.C. Bridge and V.T.V.M.

Consisting of Cabinet, Chassis and Calibrated Panel.

R.C. Bridge £2/6 plus 12½% S.T. Post: Vic. 2/11, Int. 6/-.
V.T.V.M. 54/-

UNIVERSITY TVR-C5 OSCILLOSCOPE, 5 inch

Suitable for Radio, T.V., A.F. Amplifiers, Peak-to-Peak Voltage Measurements, etc.

Vertical Amplifier: 3 stage with cathode follower, variable attenuation. Frequency response from 5 c.p.s. to 3 Mc. ± 1 db and -6 db at 5 Mc. Sensitivity 150 mV r.m.s. per inch. In "Wide Band" position response at 6 Mc. is -3 db. Sensitivity 1.4 volts r.m.s. per inch.

Horizontal Amplifier: Cathode follower 20 c.p.s. to 1 Mc. within 2.5 db Sensitivity 1.3 volts.

Time Base: A hard valve Miller phasitron circuit provides superior synchronisation. Frequency 15 c.p.s. to 250 Kc. in 7 steps with fine control. Size: 9" x 12" x 21". Weight: 34 lbs

£120 + 12½% S.T.

Deposit £35.

12 monthly payments
of £9/7/6.

Freight forward.

TV Components — M.S.P. Raster Sets Complete

70" £13/8/4; 90" £14/9/11; 110" £16/10/2; Post: Vic. 3/9, Int. 6/4.

Separate items available—

Post: Vic. Int.

70" deflection yoke 40010	£4/16/11	1/6	2/6
90" " 41032	£6/4/8	1/6	2/6
110" " 41770	£6/18/6	1/6	2/6
70"-90"-100" Horizontal Sine Wave Coil 40050	7/7	6d.	6d.
70"-90" Horizontal Linearity Coil 40048	9/11	6d.	6d.
110" " 41448	11/1	6d.	6d.
70" Horizontal Width Coil 40048	12/8	6d.	6d.
90" " 40770	14/6	6d.	6d.
110" " 41447	14/6	6d.	6d.
70"-90" Ion Trap Magnet Assembly 40247	5/6	6d.	6d.
70"-90"-110" Horizontal Blocking Osc. Transformer 40047	13/10	1/6	2/6
70" Horizontal Output Transformer 40069	£3/19/5	1/6	2/6
90" " 40773	£3/7/11	1/6	2/6
110" " 41448	£3/7/11	1/6	2/6
70"-90" Vertical Blocking Osc. Transformer 40068	15/6	1/6	2/6
70"-90" Vertical Output Transformer 40068	£1/10/6	1/6	2/6
Mask Assembly 17"	£1/12/0	1/6	2/6
" 21"	£1/13/4	1/6	2/6

W.F. bring you . . .

FOR FIRST TIME IN AUSTRALIA
FAMOUS AMERICAN

"HEATH" KITS

Heath Kit No. V7-A is the world's largest selling V.T.V.M. Kit

Specifications:

D.C. voltage: 7 ranges, 0-1.5 to 0-1500.
Input Resistance: 11 megohms.
Sensitivity: 7,333,333 ohms per volt on 1.5v.
Accuracy: $\pm 3\%$ full scale. (range)
A.C. Volts 7 r.m.s. ranges, 0-1.5 to 0-1500
Freq Response: (5v. range) ± 1 db. 42 c.p.s. to 7.2 Mc.

Accuracy: $\pm 5\%$ full scale
7 peak-to-peak ranges: 0-4 to 0-4000
Resistance, 7 ranges. Measures 0.1 ohm to 1000 megohms with internal battery.
Size 7½" x 4-11/16" x 4½".
Weight: 7 lbs.

£27/10/- + 12½% S.T.

Post: Vic. 3/9, Int. 8/4.

WATCH for further releases
of other HEATH KITS.



KEW MULTIMETER

For Accurate Circuit
Testing

Type TK50—A pocket size individual Jack-type Circuit Tester, with an insulated Panel & Steel Cabinet. Size 4½" x 3½" x 1½". Sensitivity: AC & DC 1000 $\pm 0.1\%$ AC/DC volts: 10/250/500/1000. DC current 1/250 mA. Resistance 10/100K ohms (by 1.5v. internal battery).

£6/7/9 + 12½% S.T. Post: Vic. 1/10, Int. 3/-.

GENERAL HARDWARE ITEMS

available from stock—

Split Bushes, 3" o.d. x 1" i.d.	9d.
Brass Couplings, 1" x 1"	2/-
" 1" x 1"	2/2
Insulated Flexible Couplings, 1"	8/6
Brass Extension Shafts, 1" x 1" x 24"	2/4
" 1" x 1" x 21"	3/1
Bush and Nut for 1" Shaft	1/10
Plain 1" Brass Rods, 24" long	1/-
Erinoid Spacers, tapped 1" Whitworth, 1" diam., 1" or 1½" long	9d.
Grub Screws, 5/32" x 1" long	doz. 2/6
Solder Lugs, 5/32", single ended	doz. 5d.
Brass Nuts and Bolts—	
1" x 1" Hexagon Nuts	5/3 screws or 7d. doz.
1" x 1" Screws	4/- " 6d.
1" x 1" " "	4/8 " 6d.

(All above Post. 3d.)

WARBURTON FRANKI

(MELB.) LTD.

359 LONSDALE ST., MELBOURNE — PHONE MU 8351

OPEN SAT. MORNINGS

TRADE ALSO SUPPLIED

Please include postage or freight with all orders. ★ Easy Terms on items priced from 16 Gns.

and England retained more countries which have a far greater communication density and infinitely greater interference problems than we have in Australia. I don't know how widely known As I have said, we were not there to hear and see for ourselves. The R.I.O.B. I went to was a very good one and these two societies, because of having representatives there, were able to see that their case was presented as they wished it to be. I am glad to see that.

Members of the Federal Executive—past and present—have studied the overseas trends for a long time. We have listened to the reports from different qualified persons who have been overseas at both minor and major conferences, but we have never felt satisfied at any time that we have had a full picture of what goes on and why. For years past we have interested ourselves in various matters which might have resulted in a change in the Amateur service, but which have combined to give us a more realistic picture of the gradual change which has continued to take place in the sphere of radio communication. In our minds it hasn't been a very heartening picture.

W.I.A. REPRESENTATIVE TO GENEVA

But it culminated in a unanimous desire that at the I.T.U. Conference in Geneva, our own representative there to see and hear for himself what makes an International Telecommunications Conference "tick", to "feel" for ourselves the reasons and activities which have brought about this change, to gain absolutely first hand information on where the Amateur stands in the world, to see the international standing the Amateur service has in the world today; to find out for ourselves how Governments represent the Amateur service requirements and in justice to the Amateur in Region III support the two major Amateur interests from Region I and Region II, who if reports are correct and we have no reason to doubt, have played such a vital part in saving for us the frequencies which we have all had the privilege of using in pursuit of our hobby.

Having made up our minds the matter was placed in the hands of the Federal Convention which they unanimously supported us. The result—all we knew—we were instructed to raise the funds and send our own representative with or without official accreditation. We have advanced through the Federal Councillor of the means by which we decided to finance the project and the approximate sum of money we would require. I don't care to circulate a circular letter or a donation card asking for £1—a sum which we considered small enough to ask for in an effort to have ourselves really heard. We were very happy to see many hundreds of you have willingly supported the fund; many have gladly contributed much in excess of what we asked for and we would have been very happy if 3,000 Amateurs had merely paid £1 each. There are many who have not yet contributed and we are not too far before the fund closes. With the expenses of printing, paper, postage, etc., deducted, the fund currently stands at £200. Many of the funds have also been contributed to others to contribute more if the target figure of £2,500 is not reached, but we feel sure that those who have been coming forward will get their brother Amateurs pay his way for him.

Well, now after the fund was opened, this Executive went into action to obtain official accreditation for our representative to attend the Conference with the Australian Delegation and this was agreed to by Mr. Deakin, the President of the I.T.U. It was most gratifying to us for it gives our representative official standing and that was the way we wanted it to be. You have all the advice and the help of the I.T.U. and we as our representative and we are sure you will agree that a better qualified person would not be found. I don't envy John the job of what he has to do, but we know he will put his heart and soul into it as he has done with any other activity he has undertaken during his years in the field of radio communication.

BROADCAST FROM VK2WI AT DURAL

VK2WI broadcast a short talk from John on the week-end during which his name was released. The text of a recording taken at Dural at that particular time.

"As you know now, the Institute has honoured me with selection to be its representative at Geneva next year. I don't need to tell you how much I appreciate the privilege of this selection. I am well aware of the fact that it is probably the most responsible task which has been placed upon me. I am going to try to date bearing in mind the international implications of this very important occasion. I don't mind telling you, also, that when it was first suggested that I should consider the position, I didn't take it very seriously. I couldn't imagine that there were not others more qualified to undertake the job of such a particular job. However, as time went on I gave the matter more consideration and finally I did agree to have my name submitted and was fortunate enough to be selected by the Federal Executive."

"The importance of the representation at Geneva is very definitely in my mind. I can assure you that I fully appreciate the responsibility involved in it. This is the first time the Government has recognised the Institute in this way, and it is probable, too, that no other representative at Geneva will be there under quite the same conditions."

"I don't want to say a great deal for obvious reasons at the moment, but it does seem to me that there are some things which make this visit to Geneva very important."

"The first is that, although so many of the matters which make up the Government's proposals are of a technical nature, the conference begins, it is a conference, and there will be many discussions and possibly changes of mind. I think that Amateurs will find absolutely vital that we have someone with an Institute background on the spot to do what he can about the occasion arise."

"The second point is that this is the beginning of another 11-year period which will elapse before the next conference, and I think every Amateur in Australia realises that we should be able to organize for what might happen after Geneva. We have never had a representative at such a conference to find out exactly what the world is doing and to set the basis of a case for the future. I think that is extremely important, not only for ourselves, but to enable us to carry on the necessary work for other bodies, such as the Australian Amateur Radio, to see that at all times our interests are protected."

"The third point, as I see it, is the opportunity to present our own material to the representatives of other societies who will be at Geneva. This is possibly as important as the other two points. It is a chance for Amateurs' position in the future on a worldwide basis. I think we must all realise that, whatever happens at Geneva, what might happen in the future, we must be able to do something. A united front in understanding the problems and position of Amateur societies and other countries of the world is vital to us, particularly in our own comparatively isolated geographical position."

"Let me say again that I am fully appreciative of the honor which has been accorded to me, and to assure you that I will do everything in my power to see that the interests of the Institute are adequately represented at Geneva."

I am sure you will agree that these words are indicative of what we can expect of John from now on.

Talking of Geneva, brings me to the most important points of this talk to you. First let me give you a brief outline of how the agenda of the conference is organized. The world is a country naturally has its own particular frequency allocation problems and its demands are dependent upon its geographical position and population, to some extent upon its terrain; its shipping and airline establishments, its geographical location with respect to its neighbors, its economic resources, its services, and so on. The more civilized it is, the more services it has, and so the more frequencies it has to use. It is not surprising, therefore, before these have multiplied themselves beyond belief since World War II, and as we see it will go on doing so. Looking at the bands from the Amateur point of view, we rightly consider that "miles" of the bands—to use a colloquialism—are needlessly taken up with useless frequencies, frequencies which are not being used to the utmost possible advantage to which the world population would listen, all sorts of telegraphy stations which do not seem to transmit anything but a long continuous tone, identifying signal, and sometimes not even that—in fact as Amateurs used to go on the air with their own makeshift transmitter and receiver, military, aerial, receivers, and all the rest that goes with it; learning something every time we do so and passing it on to others—one of the "miles" of our frequency space doesn't seem to be occupied at all. Unfortunately, much

observations help us not at all. To such talk is heaped a dust coat all over the world in every country.

PROPOSALS TO THE I.T.U.

All these various frequency users are only interested in one thing—their own requirements. And to this end they will fight for what they want. Administrative matters are a detail. We have no specific details of how many foreign countries present the requirements of their own frequency allocations. Conferences, but in a few minutes I shall tell you how Australia goes it. Suffice it to say that these requirements are initially presented to the Administrative Committee of the I.T.U. Conference itself. The staff of the International Telecommunications Union set all these requirements and submit them to the Administrative Committee. They have no power naturally to vary such requirements at this stage—in a large volume which is called "The Volume of Proposals". The name itself explanatory. The volume lists the entire frequency table in the various agreed service sections of the spectrum—maritime, aeronautical, amateur, fixed services and so on—against which is listed the requirements of each country. A copy of this volume is forwarded to every Administration prior to the conference and to every country known beforehand what the other countries intend trying to have agreed to at the actual Conference. The Administrative Committee, however, But let me point out one very important point. All these requirements as set out previous to the Conference are, as the volume says, merely suggestions. They are not binding. They are, as I said before, the requirements of all the countries. They say they want this frequency on behalf of their frequency users and they are telling every other country in advance to give them a chance to raise these requirements. They are not binding. They are not all sounds very nice and simple doesn't it. But after that the fun starts.

"The second point is that, although so many of the matters which make up the Government's proposals are of a technical nature, the conference begins, it is a conference, and there will be many discussions and possibly changes of mind. I think that Amateurs will find absolutely vital that we have someone with an Institute background on the spot to do what he can about the occasion arise."

"The second point is that this is the beginning of another 11-year period which will elapse before the next conference, and I think every Amateur in Australia realises that we should be able to organize for what might happen after Geneva. We have never had a representative at such a conference to find out exactly what the world is doing and to set the basis of a case for the future. I think that is extremely important, not only for ourselves, but to enable us to carry on the necessary work for other bodies, such as the Australian Amateur Radio, to see that at all times our interests are protected."

THE AUSTRALIAN SYSTEM

Now I mentioned before that I would tell you about how Australia presents its initial requirements which are included in this "Volume of Proposals". As I said, I don't know how many other countries go about presenting their requirements, but in Australia we have what is referred to as the F.A.S.C. which stands for the Frequency Allocation Committee. It is a committee of as well as making decisions regarding domestic frequency users' requirements, also carry out the work of providing the initial proposals for the International Union of Pure and Applied Physics. It consists of representatives from the Postmaster-General's Department, the Director-General of Customs and Excise, the Department of Civil Aviation, the Overseas Telecommunications Commission, the Australian Broadcasting Control Board, the Communications Commission, the Department of Defence, and the Department of Supply.

This Committee meets for all kinds of discussions and making up the proposals which are basically related to Amateur affairs. Nevertheless, the Institute sought representation on this Committee on those occasions when Amateur matters were discussed.

Members of the Federal Executive attended the relevant meetings and were very disast-

USE THE RADIO

lated with various aspects of the procedure adopted by the Committee in dealing with certain proposals which concerned Amateur frequencies, some details of which I shall give you in a moment. I am sure that you will not be among the members of the F.A.S.C. who had no vote. The agenda being discussed was sensible and we couldn't even take a copy from the room—no roomers could be admitted arising from it was sub judice at that stage. A previous letter from the Department requesting copies of the Amateur frequencies had been received and the request was that this be in the hands of the Department at a much earlier date than the previous one. The F.A.S.C. The draft was being prepared but could not be completed in time for the F.A.S.C. meetings for which we consider it should have been completed. The Department was concerned to the Department and requested that the Institute's proposals be re-heard by F.A.S.C. The Institute conferred with the Department's letters and lack of knowledge of the agenda under discussion by F.A.S.C. By this time our document of proposals was completed and filed with the Department well ahead of the date scheduled by the Department. Our request was tabled before the F.A.S.C. and some time was given to us although we were given the ear of the Committee for more than an hour, the meeting refused to vote on the request. The Department proposed on the grounds that if they re-discussed Amateur frequencies, other frequency user representatives would have the right to request a hearing, but we were told and so the whole frequency table would have to be gone over again.

However, I must say in all fairness that we were given a fair hearing during the discussions at the time, although we were not heard completely, at the time, the figures we wanted tabled I can also say that even if we had the rest of the world, we would have made little or no difference to the final motions which were passed.

From various comments I have heard made by Amateurs at different times, it appears to be the general feeling that the Department is responsible for taking them off us. I am sure that the Department, but in fairness I must point out that we have been from the truth—in respect to current proposals anyway. Remember this Committee consists of representatives from the Department, the wealth and it is they who moved motions for certain reductions in our bands. Certainly the Department has changed its mind, but there was no instance where the Chairman had a casting vote, hence my earlier remark that commercial interests (and we probably all know that the Department is not a commercial body) outside the Amateur bands are not concerned with the poor old Amateurs when it comes to frequency requirements. Already in possession of more frequencies than they seemingly require, they still press for more. As I said, and to you here it may all sound very simple for the Institute to present a powerful case for the retention of Amateur frequencies—confronted by representatives with powerful cases for frequency bands. I am sure that as easy as you think, don't think we put up a weak case, far from it! We put the Amateur case before the F.A.S.C. and we were given, even to the point of gaining support from certain members, but overall we lost some ground. From it all we saw more and more reason why we should fight to keep what we have. Our own representative to Geneva. More and more we realised that we must—without equivocation—keep our bands. We have the United States, America, England, New Zealand and all the European countries had to say at Geneva.

For the past five years we have told Commissions, both State and Federal, that the pressure would be great at what they have heard more truly were words spoken. We were not taking the attitude that this would probably be the case—we knew it was. We told members, through the Editorials and Commissions, that the Amateurs must organise themselves to provide communications networks for civil defence, that they must give up the use of the bands, that they must give themselves all the publicity they could through every possible means, that they must give up the use of Divisions to provide a technical service to the public wherever it might be needed—in fact to realise that they had to provide more from Amateur stations than a hobby which they could rest on one's laurels and bask in the glory of the wonderful pioneering the early Amateurs were out there, and that they were the time highly commended and respected. Time, I'm afraid, stands still for no man and if we don't all stir up a firm hold of what we have left, we are bound to be sold out to all.

Gentlemen, I am not being pessimistic. I am optimistic on the contrary despite the gloomy present. If other frequencies are taken away that they want, we can too. But it's no good the captains fighting without the team behind them.

When I say fight, I don't mean we intend to make our problem a personal issue with members of the Australian Delegation, some of whom administer the bands. I mean we stand at all. I use the word "fight" in the broad sense of the word as a "stand" which the entire world of Amateur Radio is taking to see that the Amateurs can be heard by the Geneva Conference. In our case the W.I.A. representative has been appointed as an observer and he is going there for just that—observe and advise. And he will be responsible to see that the liaison between the Amateurs and his Administration is not only maintained, but broadened.

We are faced with the prospect of further frequency cuts. Right now we are faced with a loss of 100 Kc. off the top end of the 80 metre band. We are faced with another loss of a further 50 Kc. off the 40 metre band. We are faced with a further 50 Kc. off the 30 metre band. It is proposed that all other bands be left as they are at present.

There is the thin edge of the wedge as we see it, but I don't you let history repeat itself for it will if we don't stand up and fight it out with our bigger brothers, the A.R.R.L. and the R.S.O.B. They are faced with the same frequency users, make no mistake about it. The W.I.A. proposals take up sixteen pages of foolscap typed. A copy has gone to your Federal Council, you go to read it—read it for you. Ask your Federal Council to make arrangements for it to be read at a meeting. If you can't do it, you can't do it. I say about it, say it whether critical or otherwise. We have done everything possible to establish grounds for the retention of our bands on the same basis as the commercial apply—density per kilocycle and density per channel. That's the way the commercial claim frequencies, so we'll have to show them that we have an international frequency user, the Amateur service has a right in the world of communications. It's being forced to fight, so he's going to fight, but let's back our fight. Let's see our heads!

Gentlemen, the monitoring stations and the radio inspectors haven't been idle. Neither have other frequency users. I am sure that a Committee like F.A.S.C. and be told the percentage of stations operating in the 80 metre band and the 40 metre band. I am sure that a month period and think up an answer fast. We did sit there and be told the 40 metre band was crowded with twelve months, night after night, and then recall an R.D. Contact to your mind as compared to all the other nights in the year, then find an answer. We tried it there and be told by radio inspectors who have for the past twelve months or more checked almost every Amateur in the Commonwealth. We found a great deal of stations that were not in the list for the Inspector to inspect, and see if you can come up with a good strong, powerful excuse! We tried!

Sit in front of representatives from commercial interests and the Australian Government. The Amateurs provide a nucleus for semi-trained electronic personnel, that they provide emergency communications several times a year for fire and flood. I am sure that they can give a powerful enough answer when they say, "but during such emergencies you only need certain fixed frequencies." I am sure that they are not being melodramatic. That's only a very brief sample of many questions arising from discussions at national level. We have found answers and arguments. And we pushed them for all we knew. The result will come out of Geneva. But remember, what went to Geneva was not the Amateur service. It must be agreed to by many countries; perhaps not necessarily all, but a lot otherwise such fixed frequencies don't work. So don't give up chaps, the fight hasn't started yet.

EXTRACT FROM HANNAED

Since making this last as a recording, I have learned that the W.I.A., as the representative body of the Amateurs, has taken a bold step alone in making an effort to preserve the rights of the Amateurs. The Hon. A. Fairhall, M.H.R., Federal Minister for Communications, has asked himself an Amateur, had something to say in the House of Representatives during the Address in Reply debate in the House on 18th February. He has been asked to reprint from Hannaed what he had to say:

There is one other matter to which I wish to refer, to which a related field. During the year there will be a meeting of the International Telecommunications Union. This is a body that meets periodically to carve out the radio spectrum, and to make laws for the orderly use of radio communications in all parts of the world. Geneva is the place to send forward to Geneva our proposals. They will there be integrated with those of all the other signatories to the International Telecommunications Union. It is a matter of great concern, because these are matters for departmental consideration, and I am sure they will be dealt with very fully. But I want to raise here on your behalf the question of persons whose interests may very well be overlooked, because they do not usually come to public attention when these matters are being considered.

"I refer to the 3,500 operators in this country of Amateur experimental radio stations. These people are fully qualified by examination to operate their stations. They are the basis of international communication, and they therefore offer a potent source of development for the country. In the hands of the Amateurs, they have always enjoyed the use of certain radio frequencies, but inevitably, in the time of peace, the channels of communication in radio has grown, so the channels available have become severely restricted. To relieve they are almost down to the minimum required to keep the peace. I believe, a very important place in public esteem, the Amateurs have played a part in the last war with relation to defence communications, and the history of the role played by them. Before the war, they have not been adequately stated. Before the war, they have been operating as reserves for the Royal Australian Air Force, and the members of the Air Force have been operating as reserves for the Air Force when war was about to break out.

"When we went into the war, Australia had no substantial communications industry. We had one or two factories which were aware of the importance of communications, and they had been making receivers. An immediate call went out for technicians for the factories, and the design, establishment and assembly of plants, and ultimately the maintenance of this equipment led to Radio Amateurs. In every disaster that has struck Australia, the Radio Amateurs have been called upon to provide communications, as I am sure they are doing in North Queensland at the moment, and in the West where the communications breakdown. Our expectations to the Amateurs take with them Amateur Radio operators. These people, who train themselves in their own homes and at their own expense, have rendered, and are rendering, very special service to this country.

"I know that the proposals affecting Amateur frequencies, which I have given some review of their frequency channels, have already been dealt with departmentally and may indeed be in the submissions which have gone to Geneva. I am sure that you will be those and I should like to study them in due course. In the meantime I urge the Government to consider the proposals. It is true that 3,500 people do not speak with a very loud voice in this country but I am sure that they will be recognised the service to the nation and that this problem should be approached constructively, and I am sure that it will be regarded with the sympathetic consideration by the Government.

"There is one other important aspect of this matter. Sir. The Governor-General's Speech referred to development of the Amateurs. We all know—that of us who have heard what is going on there or who have heard there—that, without electronics, there could be none of the things that we have seen weapons, and that, indeed, there can be no modern defence without the widespread use of electronics. This group of people occupy themselves in something that is more than a hobby are contributing to the building up in Australia of a vast pool of trained technicians who are ready to be called up at short notice as they did in 1939, the technical support of Australia's defence.

"I would end on that note, Sir. I urge the Government to consider the proposals, and indeed the preservation of all the facilities which the Radio Amateurs in Australia enjoy, and even to consider the possibility of extending, if that is possible, by international agreement."

(Continued on Page 18)

1958 VK-ZL DX CONTEST RESULTS

AUSTRALIA

C.W.—	10	15	20	40	Total
Call					
VK2ADE	3890	5850	4080	1580	15150
2GW	3505	3405	4295	1275	12480
2JX	4810				4610
2AKF	775	1785	1445		4005
2VN			1535		1535
VK3AHQ	1635	5540	3115		10290
3DQ	1690	3235	3115	525	8365
3XB				1525	1525
VK4AL	1950		4470		6420
4SN	1205	1005	285		2475
4XJ	2425				2425
VK5NO	3700	4430	3275	265	11670
5MY		4230	2725		6955
5WO	2505	2235	1500		6240
5RX			3815		3815
5BS	815	2705	55		3575
6JE				1255	1255
6OR			1185		1185
6JT	140	285	265		690
VK6RU	4780	5450	4290	255	14745
VK7CH	1715	2345	3780	540	8380
7JB	2040	1785	2485	425	6735
7KA		3780	1820		5600
7LJ	575	1710	1120		3405
VK8DB	5325	5075	3860	14060	
9XK	2305	1940	1550	710	6505
9RR		3000	2320		5320

PHONE—

Call	10	15	20	40	Total
VK2ADE	1345	5205	1055	495	8100
2AHH	1485	4235	775		6495
2AKF	880	2310	1530		4720
2AKV	720	755	895		2370
VK3WH	3220	4815	1735		9870
3AEE			4070		4070
3VT	1365	2620			3985
3HL	1765	410	1185		3350
3AJP			920		920
3LW	625				625
VK4XJ	3280				3280
VK5WP	1795	1640	1155		4590
5WO	330	1330	940		2600
VK6RU*	2895	3330	3795	100	10320
VK7WA	2120	1360			3480
7SM		1275			1275
VK9BW	1350	785	2280		4415

* Total includes 100 points on 80 mx.
Check Logs: VKs 4AF, 5NO.

LISTENERS' SECTION—

VK2-L2022	10775 pts.
VK3-BERS195	1480 "
VK3-SWL5020	1240 "
L2001	1090 "
VK6-L8003	4275 "
VK7-De Balfour	6235 "

NEW ZEALAND

C.W.—	10	15	20	40	Total
Call					
ZL1AH	4390	5570	4295		14255
1AUJ	5050	4840	3135		13025
1NG	2450	4005	4190		10605
1MQ	3495	2535	3010	1535	10575
1APM		6865			6865
1AMM	1605	2350	2415		6370
ZL2ARL	1125	2060	635	805	4655
2IQ		1680	1530	55	3245
ZL3SO	1655	2350	2225	100	6330
ZL4AT*	1680	2795	5810	1030	11475
4BO		5850			5850
4CK			2375		2375
ZL5AC	575	1780	1170		3505

* Total includes 100 points on 80 mx.
Check Log: ZL1AV.

PHONE—

Call	10	15	20	40	Total
ZL1MQ	1840	2660	1415	110	6025
ZL2RT	1750	3200	385		5335
2AHZ	215	465			2680
2IQ		300	110		410
ZL4BO		4055			4055

Check Logs: ZLs 1AUJ, 2ADS.

LISTENERS' SECTION—

DX37A	8100 pts.
ZL111	1750 "
ZL152	Check "
ZL1A5	
ZL302	3630 pts.
ZL4 (Thornton)	5660 "

OVERSEAS

C.W.—

North and South America	Pts.
W1WF	210
W2GJD	2236
W3ZAO	1850
W3DBX	1102
W3JO	221
W3BYN	112
W4NEV	4255
W4IFN	350
K5JLA	3472
K5JCC	98
W6GDM	10241
W6TT	7426
W6PH	3922
K6DDO	3094
W6KG	1736
W6VVO	1596
W6ISQ	1512
K6CQM	1140
W6RHH	184
W6CLZ	104
W7LE	2240
W8JLN	6601

Europe

Pts.		Pts.
2046	SM7MS	6
1885	SM3OW	
1885	OH3TH	858
786	OH9RD	230
50	OH2LA	80
40	OH2RW	64
685	OH2HG	63
135	EA2CR	45
20	DJ1BZ	2352
312	DJ2AE	756
988	DL1YA	Check.
72	F2BS	178
42	F3II	77
4	F8BE	7
1	OH4PA	680
1	ON4LX	360
1066	OZ4FT	432
98	OZ4RT	45
88	OZ1JW	Check.
77	UB5KAB	160
54	AI622	100
4	LA4K	72
	LA1K	63
840	LA2Q	16
24	OE1ER	1081
9	OE1RZ	828
	SP8EL	1080
	SP7HX	152
	SP6KBE	112
310	SP6RT	56
120	SP6MJ	5
40	K19F	4
20	UC2CB	16
12	UF8FB	1
8	SM5AHJ	

PHONE—

North and South America	Pts.
K2UTC	0
W4NEV	408
W4EEO	9
W6YMD	11810
W8JN	1525
W8NFX	1080
W9XTD	180
K9ALP	120
VE2AHW	1
CO2ZS	2002
HR2MC	405

Europe

Pts.		Pts.
1365	SM3BIZ	112
940	SM3EP	105
84	SM4AEQ	96
80	SM5ZO	Check.
665	SM7CAB	Check.
392	ON4BX	1152
1272	ON4DH	336
512	ON4TH	
252	OH6DM	4
1276	SP7HX	68
208	SP3PL	9
66	UR2BU	299

Asia

Pts.		Pts.
828	KR4JF	429
377	MP4BCC	192
189	VS1GZ	156
1	4X4JS	78

Africa

Pts.		Pts.
630	VQ2RL	108
112	CQ7RG	25

Oceania

Pts.		Pts.
3565	KH6IJ	420
550	KH6BT	66

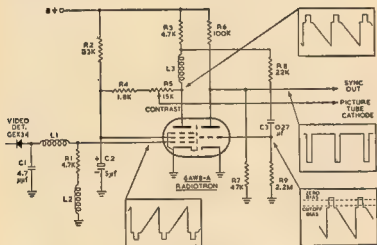
LISTENERS' SECTION—

England:	Pts.
BR520317	2320 pts.
BR515822	1018 "
BR56604	820 "
AI622	54 "
JA2-1014	60 "
HL-5001	285 "
K2-7079	220 "
YO2-476	473 "
SM5-2735	330 "
SM4-2825	210 "
C89CZ	300 "
ONL559	288 "
OK1-3947	252 "
OK1-25042	195 "
OK3-9280	36 "
OK1-1840	Check
OK1-3074	432 pts.
HESEVI	

RADIOTRON

TELEVISION VALVE SERIES

The Radiotron 6AW8-A is a 9-pin miniature high-mu triode, sharp-cutoff pentode designed for service in television receivers. Although the triode section is primarily intended for use as a sync clipper, it can also be used in other functions such as sync amplification, sync "splitting" or audio amplification. The pentode section is intended for use as video amplifier, and features high transconductance at low plate current, sharp-knee plate characteristics, and low inter-electrode capacitances. These features give a video amplifier a high figure-of-merit and make it capable of large voltage output. The output of the 6AW8-A video amplifier provides direct drive for conventional picture tubes.



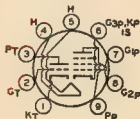
Simplified Circuit Showing Typical Application of the 6AW8-A.

In the typical circuit shown above, the negative-going composite video output from a conventional video detector is applied to the control grid of the pentode. The amplified positive-going signal across the pentode plate load, R3 and L3, is applied to the cathode of the picture tube via a suitable potentiometer arrangement which serves as a contrast control. L3 is the plate peaking coil.

The positive-going composite video signal is also applied to the grid of the triode. Grid current during the sync tips charges C3. Between sync pulses, C3 loses a very small amount of its charge through R5. Thus the sync tips are "clamped" at approximately zero grid potential. R6 and R7 form a divider to supply the triode with a suitable plate voltage. Plate-current cutoff ensures that the clamping level of the composite video signal at the grid is below control grid cutoff. Thus the triode plate current is derived from the sync pulses only. The amplified negative-going sync signal appears across the triode plate load, R6 and R7, and can be applied to a sync amplifier or splitter.



6AW8-A
SOCKET CONNECTIONS
bottom view



- PIN 1: TRIODE CATHODE
- PIN 2: TRIODE GRID
- PIN 3: TRIODE PLATE
- PIN 4: HEATER
- PIN 5: HEATER
- PIN 6: PENTODE CATHODE, GRID NO. 1 & INTERNAL SHIELD
- PIN 7: PENTODE GRID NO. 1
- PIN 8: PENTODE GRID NO. 2
- PIN 9: PENTODE PLATE



AMALGAMATED WIRELESS VALVE CO. PTY. LTD.

47 YORK ST., SYDNEY

VC259

SHORT WAVE LISTENING

BY D. M. GRANTLEY,* WIA-L2022

MUCH has been written in the past on the subject of Short Wave Listening, however, for some unknown reason very little seems to be available when a new s.w.l. decides to break into Amateur Radio. With the formation of more Listener Groups in this country, and a greater number of interested listeners on the Amateur frequencies, I have been prompted to write a few words, in the hope that they may be of some assistance to some of our newer listeners.

CHOICE OF RECEIVER

The variety of receivers available to the general public through disposals and other sources is great and rather varied. Some of these pieces of equipment are somewhat complex, having a multitude of crystal filters, bandspread, noise limiters, and many such aids to easier listening. To the beginner, these "aids" will not be of any assistance to him should he require to become a first class operator, for they tend to make him lazy and make him place too much reliance on their use. This applies particularly to the code operator, who will find that having used an elaborate receiver since he first started, will not be able to operate through heavy QRM when he has no device to assist him.

During the war-time training of the R.A.A.F. telegraphists, we had a host of oscillator interference of all types fed into the oscillator during some of our training periods and, although we did not appreciate it at the time, we certainly appreciated it when we went out into actual operating conditions. We commenced on the old faithful—R1082, a receiver which is long obsolete, then graduated to AR8s, before graduating to the more complex AR7, SX28, BC-342N, HRO's, Super-Pro's and such. The R1082 was a five-tube t.r.f. receiver with a coverage of 110-15,000 Kc., and was predominantly a c.w. receiver. They were ideal for training, as they had only a reaction control, gain, tuning and antenna tuning. Nothing else. When I came back to Amateur Radio in 1952, I had not taken a symbol of Morse for six years, yet with this little plain receiver I did very well. I still have it here, and it would still be in use, only for the fact that it is of no use on r.f. Even at this late stage, I still use only a very austere receiver, a No. 19 and converter and it is quite adequate, even in the worst "dog-pile."

LOGGING

Little attention is paid by many operators to their log, yet the log book is of the greatest importance, specially where the operator is chasing awards. I use the standard W.I.A. log book, but use a separate one for each band with the exception of 80 and 40 metres. This makes it easier for reference. Make sure all entries are accurate and put a query alongside any doubtful entry.

REPORTING

This is the most abused section of Amateur Radio. For some unknown reason, many operators consider it a gross indecency to give other than at least a 578 report, no matter how bad the incoming signal happens to be. I entirely agree with the Editor of "A.R." in the September editorial wherein he comments on the recently completed R.D. Contest.

I was checking my contest log prior to mailing it and particularly noticed that of some 400 entries, only one showed less than R4, the strength was rarely lower than 6, whilst the tone in most cases was 8 or 9, despite the fact that in more than one case the true tone was, in my opinion, about the 6 mark. (I might add here that I concentrated on phone in this contest.)

I suggest to the s.w.l.s. who can receive code that they pay particular attention to any forthcoming contest and note particularly the variations in reports given to what you consider the actual reports to be—it is rather enlightening.

When sending QSL cards, be sure and give the correct report, don't be afraid of offending the operator concerned. He will be more pleased to receive an accurate report than a false 599, designed only to extract a card from him. And don't forget to add a "C" if he suffers from a chirpy signal, or "K" in the case of key clicks.

Reverting to the "R" portion of the report, how often do we hear an R3 given? Very rarely, yet not so long ago I heard a 559 given, the op. then complaining of the heavy QRM. How he arrived at his readability I do not know.

This may sound more like a criticism than a constructive article, however it is written to give examples of mistakes we may fall into if we do not pause and consider our log entries before we make them.

One final word on behalf of our hard working QSL Managers. Print that call sign carefully on your outgoing cards; saves him a lot of time and unnecessary hard work.

RARE DX

There can obviously be no hard and fast rule about hunting for those rare DX stations. Sitting for long hours at the receiver is all very well for general listening, but I have found that most of my good ones are caught at the least likely moments. I often go into the shack to do an odd job and as a matter of course, on goes the switch, quite often resulting in a rare one on the hook. Often he escapes and if such is the case, I make a note of the time, band, etc., and pin it on the wall in front of me, then at a later date I usually manage to catch up with him.

Also on the wall I have a chart giving me the main world times at a glance. This enables me to use the local time of a station when writing out the card, a job which I do when I actually log the call. This saves a lot of time at a later date.

I also keep a card index showing the call of all stations to which I have sent cards, date, band, emission and whether or not they have replied. Included in this index are cards for stations which I know refuse to reply, or any special remarks of any interest.

GENERAL LISTENING

A good operator will log anything he hears, but I must confess that for a long time I refused to log the more common calls such as W, ZL, and the more common Europeans. However, now that I have discovered a few listener awards which are about, I log anything and everything, regardless who, where, or on what band. This is easy, but for anybody wanting operating practice, I recommend some of these DX dog-piles. Hop in and try to sort one out, I assure you there is no finer way of getting code practice other than logging some of the better class VK operators who, it is regretted, emerge from their hiding place at contest time.

I log all times in local "K" time, converting to their local time when I fill the QSL out.

OTHER POINTS OF INTEREST

An old call book can be a valuable index system, the Christian name of the station licensee, written beside his call is valuable for reference.

During the R.D. and local contests, I used it to save me a lot of time in checking to see if I had already logged a station on a particular band. By using a distinctive mark for each band I could tell at a glance if I had previously logged him.

Another gadget here which causes no end of amusement is an old car mileage indicator—a valuable asset for keeping an accurate count of countries heard. I have also a complete rig here which is battery operated for use in case of power failure.

At times when I want to listen on one band which is rather sick, I connect a single can from each set to the headphone bracket, enabling me to monitor one band and listen to another—an old R.A.A.F. trick.

As previously stated, this article is written primarily for the benefit of our younger members and I sincerely trust that it may be of some assistance to them as they take part in this wonderful world-wide hobby of ours.

SOLID STATE RADIO FREQUENCY AMPLIFIERS

(Continued from Page 4)

1. "Operation of a Solid State Mixer." H. Seidel, G. Feher, H. Seidel, *Phys. Rev.* 108, 1957, p. 762.
2. "Solid State Mixer Amplifier." A. L. McWhorter and J. W. Meyer, *Phys. Rev.* 109, Jan. 1958, p. 312.
3. "Inherent Noise of Quantum Mechanical Amplifiers." M. W. P. Strandberg, *Phys. Rev.* 108, 1957, p. 617.
4. "Spontaneous Emission on the Noise Figure of Mixer Amplifiers." R. V. Pound, *Ann. Phys.* 1, 1957, p. 24.

* Mount Raven, Holbrook, N.S.W.

MEET THE OTHER AMATEUR AND HIS STATION

RON HUGO* VK6KW

Ron Hugo is a West Australian by birth and upbringing and his association with Ham Radio extends to pre-war days. He passed his A.O.C.P. in 1938 and became active on 10 metres working W DX with a W8JK beam.

During the war, Ron served in the A.I.F., first in radio, and later in a radar unit. On the re-issue of Amateur licences in 1946, he returned, working 10 and 20 metre DX.

Main interest in Ham Radio now is DX. On the constructional side, Ron has always been interested in receiver building, and until recently, has always used a home-brew receiver. In fact, his shack is still, with this one exception, completely home-brew.

In the photograph, from left to right, are home-brew Geloso v.f.o., 8146 buffer, HK287B final transmitter, 811g class B modulator in same cabinet; AR88D



receiver; behind the operator is a control panel which includes selsen compass indicator and monitoring c.r.o. On extreme right is a modified 522 for use on 144 Mc

The antenna system consists of a 6GU beam for 10, 15 and 20 metres, and Wyndoms for 80 and 40 metres.

Ron has been very active in W.I.A. affairs, having been both President and Treasurer of VK6. For the past few years he has been Federal Councillor. He is also President of the Radio Society of Perth.

Other hobbies include 8 mm. cine photography.

* 8 View Street, Subiaco, Western Australia.

CYCLONE "CONNIE" VISITS QUEENSLAND

You all remember "Bertha" last year, April (see Emergency, "A.R." May, 1958), and the trail of damage she left in her wake. Well, this year her sister was born and soon became a husky howling infant that soon grew up and exceeded her sister "Bertha" in fury.

Time, 1010 hours, 18th February. "Connie" certainly getting frolicsome and trying her hardest to grow up in a hurry.

Bob VK4RW called CQ on 7050 Kc. and was answered by Percy VK4PC and later VK4MF came into the net. Percy was given a blow-to-blow description of the velocity of the wind gusts as they passed VK4RW's shack and headed towards VK4MF.

At 1218 hours the power lines came down and VK4MF and VK4RW were off the air. Percy thought the worst had happened. VK4MF had several blackouts of power during the afternoon and VK4RW came on again when the power was restored at 5.30 p.m. VK4WI came on and the emergency net stood by while he called in and collated reports from the various Amateurs from Atherton in the North to Sarina in the South, assisted by operators in various towns further South.

Unfortunately, the cyclone crossed the coast around Ayr and Home Hill and did tremendous damage, and decided to give a final twist at Bowen, just to show the people there they were not forgotten and that "Connie" was more forceful than "Bertha" last year. The damage she created far exceeded previous years.

The two Amateurs in Ayr and Home Hill were unable to come on the air and give first-hand reports. (Maybe

they should be given assistance to obtain emergency power supplies.)

Next day, 17th, reports of damage began to filter through. The emergency net grew larger as "Connie" moved further South, losing intensity, but bringing rain and floods in her wake.

At 6.23 p.m. the official station VK4AA was heard asking where VK4PW, at Collinsville, had got to as communication had been lost with that town like last year. All took turns in calling VK4PW, but no luck as VK4PW had folded his tent a fortnight earlier and shifted to Mackay. He came on at 8.30 p.m. from his new QTH and announced the fact that VK4ZO should be on c.w. A call was given over the Broadcast Stations and Jim popped up on 7090 Kc, crystal controlled on c.w. but conditions were too difficult for VNT to pass traffic to him. A golden opportunity was missed after sterling performance of VK4PW last year.

The W.I.A. in Brisbane can be truly proud of the way the various Amateurs called in during the two days to offer their services. Had the official channels been totally disrupted we were there to help out.

Assistance of VK2WI and VK7WI in vacating the 7050 Kc. channel was appreciated. VK2WI shifted to 7040 Kc to receive reports from the Northern River Districts of that State.

Seventeen Amateurs were logged at this QTH in the net. Well done chaps. Your assistance was appreciated.

Do not forget our motto: "Always be ready."

—R. E. Wilson, VK4RW.

The following has been extracted from the Queensland press.

Ayr and Brandon.—Of a total of 320 houses damaged, five were completely demolished, 12 half demolished and 50 lost 50% or more of the roof. A rough estimate of damage to houses is £100,000, and to business premises £30,000.

Home Hill.—This town appeared to have suffered the most severe damage. The shopping centre was very severely damaged. Shop windows and awnings disappeared and many shops collapsed. At least 20 houses were demolished and there was very extensive damage to many others. Damage was estimated at £150,000.

Bowen.—Twenty-eight houses were completely demolished, about 200 suffered major damage, and 250 some minor damage. Damage estimated at £100,000.

Some information concerning damage to the towns of Proserpine and Mackay and districts gives a somewhat similar picture, although the damage appeared to be less as the cyclone had abated somewhat.

Unofficial estimates in the hands of the Commonwealth Government place the total cyclone damage in Northern Queensland at £2,000,000.

TECHNICAL ARTICLE AWARD

The Publications Committee has pleasure in announcing that the Technical Article Award for 1958 has been made to Mr. E. E. Cornelius, VK8EC/T, for his series of articles on Amateur TV.

The Committee was gratified with the high standard of technical articles submitted during the year and looks forward to continued support in this matter.

AMATEUR CALL SIGNS

FOR MONTH OF JANUARY, 1959

NEW CALL SIGNS

- VE—New South Wales
2AL—R. L. Brook, 64 Donnison St., West Gosford.
MT—M. A. Harris, The Manse, Brighton Le Sands.
2LB—F. M. Barden, Flying Doctor Service, Broken Hill.
2AA—W. S. Yarrington, 438 Lane Lane, Broken Hill.
2ACB—B. E. Bolick, Sutton, via Queanbeyan.
2ALW—H. J. Weatherley, 20 Sebastopol Street, Marrackville.
2AUT—G. Taylor, 3 Brande St., Belmore.
2ZKA—J. W. Ashley, Laughnan St., Coolamon.
2ZGH—G. H. Hodder, 5 Barwin St., Forbes.
2ZKL—K. B. Larkin, 18 Countess St., Moama.
2ZMD—M. C. Darby, Tathra, Spring Ridge.
2ZNR—R. Roberts, 25 Inglis St., Kotara.
Victoria
3OP—R. L. Brentwood, 23 High St., Mount Albert.
3OV—G. A. B. Pearce, 207 Prospect Hill Rd., Surrey Hills.
3PE—R. R. Elkin, 173 High St., Prahran.
3PH—W. J. Hewitt, 8 Shelley St., Wendouree.
3PR—C. J. Buckley, 18 Robina Rd., Eaglemont.
3QX—N. Campbell, Broadmeadows Hostel, Camp Rd., Broadmeadows.
3ADE—D. L. Bradford, 22 Knox St., Reservoir.
3AGB—R. H. Goodman, 66 Wellington St., Kew.
3AHA—K. J. Hartigan, Sigdonia, via Kyneton.
3ANS—A. N. Blackburn, Station 123 Buckley St., Footscray, Vic., Postal 5 Wick St., Dennington, N.S.W.
3AQ—F. R. Ladd, 33a Murphy St., Stn. Yarra.
3AQL—C. W. Harwood, "Rosebank," South Kyneton.
3ASS—East Sale R.A.A.F. Radio Club, R.A.A.F. Station, East Sale.
3ZAP—P. Furr, 23 Princes Highway, West Warrnambool.
3ZBC—K. Connelly, 214 Warrigal Rd., South Oakleigh.
3ZBR—J. F. Ryan, Residence No. 353, R.A.A.F. Base, Point Cook.
3ZGM—P. Milne, 20 Wilmore St., Northcote.
3ZGW—J. G. Fricke, 14 Garner St., St. Kilda.
3ZNC—G. Collings, 3 Ashburton Rd., Glen Iris.
3ZHD—G. C. F. Dillon, 4 Scott St., Beaumaris.
3ZHG—J. Clark, 13 East India Ave., Nunawading.
3ZHM—H. I. Murray, 45 Ballarat Rd., Maidstone.
3ZHT—V. Cox, 3 Hampton Gr., Camberwell.
3ZIT—T. E. Straughair, 185 Stephen St., Yarraville.
Queensland
4AU—B. R. Aubrey, 44 Elbury St., Gaythorne.
4LB—A. Bookholt, H.M.P. Reserve, Private Mail Bag, Stuart N.Q.
4TW—C. T. Ferris, Ringtail, via Pomona.
4ZBA—A. R. Bradley, 55 Wardell St., Ashgrove.
4ZCW—W. B. C. West, 23 Hawthinson St., Mur-arrie.

South Australia

- 5IM—K. W. Garrett, 20 Elston St., Lockleys.
5ZCO—D. J. Caddy, 78 Matthews Ave., Seaton North.
5ZCP—J. S. Burns, 16 Bernard St., Findon.
Western Australia
6ZCC—M. L. O'Rourke, 129 Parkin St., Rockingham.
6ZCD—D. J. Reitze, Broadcasting Station 6WA, Wagin.
Tasmania
7TT—T. J. Tonge, 83 Leven St., Ulverston.
Territory of Papua and New Guinea
8JG—J. M. Georgiadis, C/o O.T.C.(A.), Rabaul.
8JV—J. V. Denholm, Wilkes.

CHANGES OF ADDRESS

- Victoria
1VK—Australian Capital Territory
1VF—E. Penikis, Northbourne Ave., Canberra.
New South Wales
2FS—B. C. Fleck, 26 Sullivan St., Kempsey.
2SB—B. W. Chaplin, 31 Grace Ave., Seacroft.
2SJ—G. A. Clapham, Newcastle and Brunswick Sts., East Maitland.
2SBL—W. A. Easterling, 176 Forest Rd., Kirra-raw.
2ADV—C. Mc. Hicks, Stuart St., Forster.
2AJM—F. H. Bull, 14 Lytton St., Cammeray.
2AKQ—J. H. Lambert, Lot 4, Bocks Road.
2ANB—R. J. Bety, 41 Lawson Pde., St. Ives.
2ANV—T. Bremner, 23 Kardsella Ave., Killara.
2AQX—R. Grivas, 328 Roberts Rd., Greasacre.
2AYE—D. E. Evans, 63 Todman Ave., Kensington.
2ZBU—A. M. La Macchia, 25 Derby St., Wah-roona.
2ZEM—E. F. Matthews, 24 Etalong St., Auburn.
2ZFM—B. C. Milne, 61 Russell St., Eastwood.
2ZFW—W. A. Fulton, Lot 25, Mount Dandenong Rd., Kilebyth.
3IK—L. K. Sewell, 73 Viewville Rd., N. Balwyn.
3ZP—P. D. Williams, "Treetops," Kent Hughes Road, Eltham.
3ZJ—J. A. Williams, 26 Mummy St., Mount Waverley.
3PO—D. A. Miller, Lot 5, Moola St., Nerrina, Ballarat.
3QN—P. E. Mapstone, 42 Berkeley St., Huntingdale.
3TU—J. F. Irvine, 8 Eton Square, 476 St. Kilda Rd., Melbourne.
3US—G. M. Churchward, 20 Smith St., Leon-sth.
3ABS—R. W. Sandon, 6 Hudson St., Caulfield.
3AJG—J. R. O'Halloran, Hamilton St., Murtos.
3AKT—M. K. Tulloch, 131 Junction Rd., Nunawading.
3ALU—L. E. Lloyd, Grey St., Nyahwest.
3APG—P. J. Grigg, Lot 44, Glenburn St., Newcomb, Oseelong.
3ARH—J. B. Hawke, Day Ave., Omeo.
Western Australia
5HK—D. E. Graham, 109 Edinboro St., Mt. Lawley.

Territory of Papua and New Guinea
8HI—L. Reebel, Station: Lawes Rd., Port Moresby, Papua, Postal: C/o. Posts & Telegraphs Dept., Port Moresby, Papua.

CANCELLED CALL SIGNS

- New South Wales
2AEX—C. R. A. Armstrong
2AUA—M. C. Carpenter.
Victoria
3OB—L. T. Burrows.
3UB—R. D. Tynms.
3ZEV—H. A. Harris.
Queensland
4HW—H. J. Weatherley.
4ZRC—R. D. Campbell.
Western Australia
6BY—R. R. Aubrey.
Territory of Papua and New Guinea
9KC—W. Hook.
Permits granted for television experiments
South Australia
5MK/T—S. G. McLean, 23 Celtic Ave., Clovelly Park.
5ZCJ/T—J. E. Barker, 41 Gertrude St., Glen-dore.

Low Drift Crystals FOR AMATEUR BANDS

ACCURACY 0.02% OF STATED FREQUENCY

3.5 Mc. and 7 Mc.	
Unmounted	£2 10 0
Mounted	£3 0 0
12.5 and 14 Mc. Fundamental Crystals, "Low Drift," Mounted only, £5.	
THESE PRICES DO NOT INCLUDE SALES TAX.	
Spot Frequency Crystals Prices on Application.	
Regrinds	£1/10/0

MAXWELL HOWDEN
15 CLAREMONT CRES.,
CANTERBURY, E7,
VICTORIA

NOW AVAILABLE

IRONCORE TRANSFORMERS

FOR

ORYX 6 & 12 VOLT SOLDERING IRONS

THESE ARE A FURTHER ADDITION TO OUR RANGE.

WRITE FOR CATALOGUE.



IRONCORE TRANSFORMERS PTY. LTD.

HIGSON LANE, MELBOURNE, C.1

Phone: MF 4771

Three-Band Converter

N. CASEY,* VK9NT

HOW many of us, especially among those who have just gained their call signs, have thought and searched for some type of circuit which would give us as much bandwidth as we wished on all bands without plug-in type coils, and if possible using only one set of coils?

The accompanying circuit is the same as the converter in use at this QTH and gives a very good account of itself.

Most of the items are available out of your junk box or through disposal stores, so that all that is needed mostly is the patience and energy to do the job.

The gang is made from a b.c. three-gang condenser and after carefully unsoldering the stator plates from their mounts in each section of the gang, work is proceeded with to remove the unnecessary plates, leaving only four and these being double spaced. The same treatment is given to the rotor plates, but in this case five plates are left (double spacing, of course). The stator plates can now be replaced and aligned.

The coils are best wound with whatever formers are on hand, preferably about 1" diameter, and slug-tuned (although slugs are not absolutely necessary). The aerial and r.f. coils are wound by getting just sufficient turns to tune 14 Mc. with the 100 pF. condenser, and the oscillator coil to tune to the difference between the selected i.f. frequency, i.e. if 2 Mc. is chosen, as in the author's case, then the oscillator coil should tune to 16 Mc.

The primaries in each case should be wound with about 30 a.w.g.. Approximately 6 turns will be needed on the aerial coil (depending on the impedance of the feed system, etc.), whilst the r.f. should be about 8 turns of the same gauge wire.

The oscillator primary should be interwound with the secondary, and for a start about half the number of turns of the secondary should be wound on.

After the converter is made up and you have placed a meter in the B+ lead to the oscillator coil, you should remove half a turn at a time from the primary until an even plate current over the three bands is obtained.

After adjusting the oscillator primary, the aligning period starts. Starting with the 14 Mc. band, adjust C27 to 14.00 Mc. with C25 in full mesh. The dial is then swung over to open mesh and 14.35 Mc. is tuned to with the bandspread condenser (C24). Return the dial back to full mesh again and 14.00 Mc. is again retuned with C27.

This process is continued with until you have 14.00 Mc. at full mesh and 14.35 Mc. at full open mesh.

The same procedure is again carried out for 21 Mc. Adjust C28 for 21.00 Mc. with full mesh and C25 tuned for 21.45 Mc. with full open mesh.

C29 is tuned for 28.00 Mc. and C26 is tuned to the h.f. end of 28 Mc.

R.f. coil alignment is carried out in the same manner as the oscillator coil. 14 Mc. is peaked with C11, and 14.35 Mc. peaked with C14.

21 Mc. is peaked with C12, and 21.45 Mc. is peaked with C15.

28 Mc. is peaked with C13 and the h.f. end is peaked with C16.

The same applies with the antenna coil. 14 Mc. peaked with C1 and 14.35 Mc. with C4.

21 Mc. is peaked with C2 and 21.35 Mc. is peaked with C6.

28 Mc. is peaked with C3 for the low frequency end and C5 for the h.f. end.

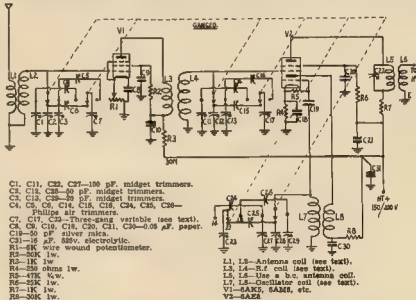
The tracking should be found to be OK, but any errors may be compensated

for with the use of the iron slugs, using the iron slugs to peak the i.f. end in each case, and remember that once a slug is shifted, then you have to retune each band.

No aerial trimmer is required, even though the original job has one it is never used, as whenever tried, the tracking of the gang is found to be true.

The output coil is tuned by the slug and C22 for optimum results. Note the connections!

150 volts is quite sufficient to run the converter and it will be found that a better signal to noise ratio will result at this voltage.



CQ CQ AUSTRALIAN AMATEURS DE THE FEDERAL EXECUTIVE

(Continued from Page 13)

I think you will agree that it is gratifying to know that a Member of the House of Representatives has such a keen sense of the value of the Amateur service to a democratic country like Australia and is prepared to voice his thoughts on behalf of Australian Amateurs.

Overseas magazines have been in touch with your Executive, as they have been with other Amateur Societies, and the "glor" for considered verdicts will be published all over the world on behalf of the Amateur service which can easily can be forgotten in this complex world of communications in which we live today.

In conclusion I'll say this, at the expense of reiteration. If you don't use the bands, you stand to lose them. Amateur Radio without a voice at Geneva will be a case of out-of-sight-out-of-mind. John Morley has a job to do, He'll do it. You must support him. Under the rules of the I.T.U. he can speak as a non-voting member of a Delegation with the permission of his Delegation and the Chairman of the Committee or Sub-Committee working at the particular time. Whether he gets that

chance depends on John, and I think you will agree he is capable in every direction. How long he can stay there depends on you! If you haven't subscribed your \$1, would you give it some further thought?

I hope I have given you some insight into the real dangers which beset our cherished hobby and that the time, effort and finance which has gone into this project will protect our hobby for our sons and their sons.

73,
Max Hull, VK3ZS.

NEW ADDRESS FOR MAIL TO "AMATEUR RADIO"

All manuscripts, notes and correspondence to "Amateur Radio" should be forwarded to:—

P.O. BOX 36,
EAST MELBOURNE, C2,
VICTORIA.

* C/o. Dept. of Posts and Telegraphs, Rabaul, New Guinea.

MADE FROM
HIGHEST QUALITY
MATERIALS

TELEVISION
and RADIO
COMPONENTS

"Q-PLUS"

ANNOUNCE THE RELEASE SHORTLY OF THE LATEST
ADDITION TO THEIR LARGE RANGE OF PRODUCTS

AN
ECONOMY
MODEL

14" 110°
T.V. KIT

For Only 99 GNS. Complete With
Picture Tube, Cabinet, etc.

★ ★

FEATURES OF THIS KIT ARE—

- Minimum number of components used in construction.
- Extreme compactness in height, width, and depth.
- Power supply is by a fully rated Transformer NOT a hot chassis.
- Top quality components are used throughout.

★ ★

WATCH FOR THIS KIT TO BECOME AVAILABLE

AT ALL RADIO AND T.V. DEALERS, OR DIRECT FROM—

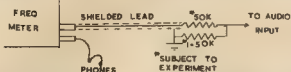
R. W. STEANE & Co. Pty. Ltd.

HEAD OFFICE—
MELBOURNE: 2a Montrose St., Hawthorn, E.2. WB 3377-8-9
and at SYDNEY: 8 Cadow Street, Pymble. JX 3556.

HINTS AND KINKS

AUDIO TEST TONE

To obtain an audio test tone for my outfit, I use a BC221 frequency meter with the crystal calibrator switched in, and then by adjusting the pitch of the heterodyne against the calibration book, can get a fairly good tone.



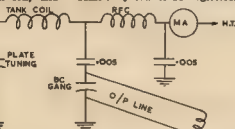
—V. J. Kinney, VK6VK.

SHUNT COUPLED PI-COUPLED

An idea to overcome the problem of burning out r.f. chokes in transmitters is to use shunt coupling in pi-couplers. In this arrangement, I have fed the d.c. path through the tank coil, and

placed the r.f. choke at a much lower r.f. voltage as seen for the circuit.

The d.c. blocking condenser has to carry all the circulating tank current and needs to be a substantial one. Here I have used an 0.005 μ F. capacitor with good results. Also, the reactance is sufficiently low to be neglected.



The output to the aerial coupling unit is taken from across the ganged b.c. condenser as usual.

This method has been in use at VK6VK for a number of years.

—V. J. Kinney, VK6VK.

D.X.C.C. LISTING

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call No. rise	Call No. rise	Call No. rise	Call No. rise
VK6RU	2 221	VK6KW	4 184
VK6MYK	43 111	VK6BE	3 176
VK6AFJ	21 212	VK6RW	32 164
VK6WL	14 311	VK6RE	16 163
VK6ATN	28 304	VK6DB	21 161
VK6ER	13 158	VK6WF	16 160
VK6AB	42 112	VK6LJ	44 108

C.W.

Call No. rise	Call No. rise	Call No. rise	Call No. rise
VK6FV	29 248	VK6KU	42 213
VK6KB	10 245	VK6YL	36 203
VK6CK	36 233	VK6BY	45 202
VK6PF	13 238	VK6RU	18 186
VK6BE	8 222	VK6EO	3 191
VK6ER	8 218	VK6K	22 176
VK6RJ	42 149	VK6KW	40 112
VK6KU	42 111	VK6W	40 111

New Members
VK6KU 89 106

OPEN

Call No. rise	Call No. rise	Call No. rise	Call No. rise
VK6ACK	6 250	VK6KU	61 221
VK6AFJ	21 245	VK6K	74 220
VK6RU	2 243	VK6JG	3 215
VK6ER	7 233	VK6JE	12 210
VK6BE	4 231	VK6ATN	69 210
VK6WL	42 228	VK6K	13 201

New Members
VK6AO 76 219

FIBRE-GLASS WHIPS

Resonance of helical fibre-glass whips may be altered by winding a few inches of magnetic recording tape around one end instead of removing part of the helix.

—D. L. Kinsella, VK6AKK.

FOR FIT PERSONS ONLY!

FOX HUNTING IN THE U.S.R.

In "Paano" No. 6, 1958, the Russian Amateurs' journal, there is an outline of the methods of fox hunting in the U.S.S.R. Apparently it is treated as a "States-wide" athletic contest.

Hunts are conducted on foot and there are three foxes—apparently stationary. The first fox is located four kilometres from the start; the second within three kilometres of the first, and the third within three kilometres of the second. Frequencies used are 3.5 mc., 38-40 mc., and 144-146 mc.

Home-made equipment is a must, but the accent is on athletic fitness. The contest is conducted in each State and the winners progress until a "grand champion" emerges.

PORTABLE ANTENNAE

When operating on low power an efficient antenna is very desirable; mismatches here can make the rig useless in adverse conditions. An inexpensive antenna can be made up from P.V.C. bell wire, and any length of 300 ohm ribbon that the dealer has lying around. Most t.v. salesmen will give away any number of short bits and pieces.

I experimented with the following antennae recently on a 10-watt transmitter, and list them in order of performance:

1. Folded dipole and 300 ohm feeder.
2. Windom (single feeder won't short out in the rain).
3. Zepp (open wire feeders).
4. Dipole fed with (a) Lamp flex; (b) 300 ohm ribbon; (c) Twisted bell wire.

(All of these dipoles were useless in rain.)

5. End-fed half wave.

Ice cream sticks dipped in melted candle grease make good spacers for the dipole or Zepp feeders, and the antenna may be raised 50 or 60 ft. by stringing fishing line over a high tree. My line showed no signs of breaking after a month's vacation. Bell wire will not support much weight, so it's risky using a long co-ax feeder.

—D. L. Kinsella, VK6AKK.

AWARDS

MOORABBIN AND DISTRICT RADIO CLUB

Amended Rules for the Award of the HON. MEMBERSHIP CERTIFICATE

The object of this Award is to promote interest in, and friendship with, VK3 contacts. There are many active transmitting members of the club. Ask all VK3 contacts: "Are you a member of the Moorabbin and District Radio Club?"

1. To become eligible for the Award, Australian mainland stations including VK37 must be contacted by radio four times, member stations currently financial at the date of contact.

2. Overseas stations including VK0 and VK9 call signs must be contacted by radio five member stations currently financial at the date of contact.

3. The club station VK3APC may be regarded as a financial member station for this purpose.

4. On completion of the required number of contacts, the applicant must forward to the Certificate Officer by post, a return of 41 of the call signs of members contacted, together with the times and dates of contact and his own correct postal address.

5. After verifying with the logs of the named member stations, a Certificate of Honorary Membership will be awarded and forwarded by post.

6. If the required number of member stations is contacted for a second or subsequent year, further awards may be made. The return will take the form of an emblem for attachment to the certificate. Stations named for such an award must not include those already named for a previous award.

7. Honorary membership will allow all the privileges of full membership of the club, less the counting of contacts with Honorary members for the award of this certificate and less the power to vote.

8. This award is not available to financial members of the club. Station operators who have been financial members must have resigned their membership in writing prior to the date of any contacts named for the award of this certificate to themselves.

9. Rules and conditions of this award may be amended by a police of motion one month prior to being put to the vote at a regular meeting of the club. After being passed by a majority of members present, the amendments will come into force.

10. The address for certificate correspondence is: Moorabbin and District Radio Club, C/o Wireless Institute of Australia, Victorian Division, at the current address of the W.I.A. Victorian Division, which is obtainable in call books and other publications.

Amateur Radio, April, 1959

Imagine that it will be the best made v.f.o. in VYCS.

Was having a chat to Sid SBE, who tells me that he is very keen to get going with a v.f.o. of 58 Mc. with the above name J4S Mc. Sid is anxious to contact any locals who could receive his transmissions.

The v.f.o. meeting was a huge success and VK3 now has its own V.K.F. Group, subject to ratification by Council. The constitution was agreed upon and passed at the meeting and the ballot for the Committee resulted in the election of Barry SZBZ, AJ SZCR, Col 580, John ZBNA and Neil SZAW.

Check it out now. See you at the next fox hunt.—SZAW

On Sunday, March 8, John 5DJ, Doug SKK, and Collin 5KJ, situated at the top of Mt. Lofly, established contact with VK3 SBE, situated just south of Snowtown, on 28 Mc. Signals were received at 58 at Mt. Lofly and about 37 at Snowtown. The distance covered was about 85 miles. Only time prevented greater distances being covered. Further attempts at greater distances are to be made later.—SKX

WESTERN AUSTRALIA

Perhaps the main item of interest this month is the opening of the 58 Mc. beacon, put on by the V.H.F. Group of Western Australia. The frequency is 58.1 Mc. and the beacon is put on in a 287 Identification is by c.w. (auto) and call is VK6VF. At present the station is running into a vagi beam, but it is hoped that a stacked column of tubes will be in use soon. Hours of operation are limited to those that an op. can be in attendance, roughly 1600 W.A.S.T. to 580 W.A.S.T. The duty goes from day to day. One thing you can be very sure of—if you hear it, someone is around so about the dickens. A break in the transmission means that the op. is tuning the band from 55-61 Mc. The aim, of course, is to work Africa; this should help a lot. JA broke through again in early Feb. and many stations were contacted by the VK3 stations who have been on the band. The openings so far have been as good as gold. In one sitting 6ZBU worked 40 JA stations in one opening. HKKA has made daily appearances with signals running for hours at a time. Also around the 49.8 plus mark several f.m. networks have been heard. The origin of these is shrouded in mystery, but one could be in Okinawa; the voices are good old American.

The last Fox Hunt was run by Kevin 6ZCB and Cedric 6ZIN. The fox was very cunning, hiding behind a steel bridge on the wrong (or me) side of the river. At the last Group meeting a very enjoyable lecture was presented by Wally 6LW. He showed a 60 Mc. transmitter powered to 75. Unfortunately, a hold up in supplies of v.h.f. transistors prevented a complete demonstration in that the final was not running. However, results with the exciter really surprised those present. One at least is obtaining the bits to get something similar going himself.

Noel 6ZBG has been absent in the East. He has now returned and can be heard most evenings with the beam on Africa and India. Preference.

Jack 6ZBU has been "trans-portable" in Mandurah, putting a 5/8 signal into Perth (48

CORRESPONDENCE

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

AUSTRALIAN DXCC AWARD

Editor "A.R." Dear Sir,
I feel that I had better rise to the bait of VKQZ's letter in the March issue of "A.R." For goodness sake don't do away with the Australian DXCC, as I have been trying to make the grade for years and don't want to be "dipped on the post" because a few are disappointed!

I am quite happy to accept the W.I.A. list of countries. It is published in the January issue of "A.R." each year, so there is no excuse for me even feeling "frustrated" in "trying to assess their countries worked"—you just check off against the W.I.A. list! The objection to the use of the A.R.L. countries' list by N.Z.A.R.T. for the VK-2L Contest seems trivial—if the N.Z.A.R.T. are to run it, let them run it their way. If you don't like the rules, why enter?

Re there not being room for two DXCC awards, there is one very good reason for having an Australian DXCC Award. It is not worth the risk sending his precious cards overseas, and perhaps losing them in the mails when he can qualify locally. In conclusion, I can see point in VKQZ's and VKQK's criticism of the A.R.L. countries' list, but I think that it is all the more reason to retain the W.I.A. list. (I hope you get some more blues, VKQZ.)

—W. Stevenson, VIEAWS.

Editor "A.R." Dear Sir,

Reference the letter from VKQZ in March issue concerning the Australian DXCC Award. I regret to disagree with my friend Frank in some aspects.

Let us retain the Australian DXCC Award—it's only a little behind the times and when the list is brought up to date it will be the same as the A.R.L. list.

Plainer and Mandurah (50 miles) mean feet for 5w. and a mobile whip. Willie, the whittling, eluded Jack's line and bait, but we believe he made do with some cobblers.

580 has almost finished the main part of his building operation and has started in his new shack. The "old man" has been having plenty of trouble from noisy power lines, and brother, we mean noisy.

Heard 6WG in Albany being called by JA in one opening, which appeared to be general all over Australia, since VKT was called also. 6ZBP was in the same opening.

6MG was worked from Kalamunda again on 5 Mc. Unfortunately signals were weak and truly on the down grade by the time Mac was heard so the contact was not a good one. That's about it for the month. Cheers.—SBE.

Think of the time and money you save in not having to send your hard-earned QSLs over to U.S.A. in order to obtain credit.

This is a service which the W.I.A. is performing for its members. Let us make use of it.

We, the DX minded Ham, can make it what we want by the simple expedient of telling our own elected representatives on Federal Council just what we want in the way of an Australian DXCC. Let's do some lobbying and achieve our objective.

The reference by VKQZ, to the number of countries in the A.R.L. list is simply exploded. Some of the QST's published the rules which the DXCC follows in deciding who is a country. They still follow these rules. The July list of 290 countries is published. It is amended from time to time when new claims are put forward. Additions to the list are notified regularly in QST, and by WIAW in official broadcasts. The DX fraternity are of them—they even know when applications are refused, as does happen.

I'm all for the A.A. and its Australian DXCC—thanks to the Institute for another service to the Australian Ham.

—Alan Brown, VK3CX.

Editor "A.R." 50 Mc. W.A.S.

Editor "A.R." Dear Sir,

As I, like many others, have worked all States on 50 Mc., but because I am unable to work anyone in the Northern Territory, which is 50 Mc. area, I am not able to claim the W.A.S. Certificate.

As there has not been anyone on 50 Mc. for DXCC, I am not sure if I am not eligible and others be penalized through no fault of ours! I worked all States but the Northern Territory in 1961 and twice since including this year. I've got about time something was done about it so a few more call signs can be added to the 17 published each month?

—A. W. Rushby, VK3ABR.

SURPLUS RADIO EQUIPMENT

Editor "A.R." Dear Sir,

In the March '66 issue of the magazine there is a summary of surplus radio equipment. One of the pieces of equipment is a surplus R/50/ARN-5A (page 8, left hand column, 4th item from bottom) and this is listed as having seven 6AG6s. This is incorrect: the tubes are 6AF6, or at least in the two units I have they are.

It may be of some interest to note that this surplus item is running the aerial line, ideal for use in 238 Mc. converters.

—David Rankin, VK3KAZ.

PROPER UTILISATION OF THOSE BANDS

Editor "A.R." Dear Sir,

Perhaps the Council might create a little interest and be of assistance to the fight for the retention of frequencies for the use of the Amateur service.

Last night I had the very good fortune to hear the very fine address given by the Federal President of the Wireless Institute of Australia, Mr. Max Hall, over 5 Mc. I have a great pity that this splendid address will only be heard by possibly a relatively small percentage of those who profess to be Amateurs. As one who has listened around the band at all times of the day and night for many years, I can fully appreciate the difficulties facing the radio hobby delegations.

Very little assistance, other than financial, is being given by many of the Amateurs. This is well illustrated by the very poor use made of the bands, especially in conducting experiments. There are some who use the bands regularly, but, unfortunately, indulge in endless inane chatter, sometimes they drive in using their privileged position to moan about work prices, discuss religion (especially a certain religious ecstasy), or discuss the conducting emergency nets (how dare they want to keep one frequency clear), make personal attacks on others (in their absence of course), or to boost some commercial cause, often indulging in blatant advertising—none of these things help the status of Amateur Radio, especially when one remembers that there are interested observers taking note. How on earth can the I.T.C. representative justify the retention of the frequency who suggests that some of them is taking place—remember that these observers are not deaf, but very much on the alert!

If you want to retain the existing frequencies, give your I.T.U. representative your active support by using the bands and conducting worthwhile experiments where a moderate amount of individual nature.

—Ian Drysdale, Assoc. Member VK3 & VKA, Assoc. N.Z.A.R.T. and R.E.G.B.

Duralumin Aluminium Alloy Tubing for Radio Aerials

★ LIGHT ★ STRONG ★ NON-CORROSIVE

STOCKS NOW AVAILABLE FOR IMMEDIATE DELIVERY

ALL DIAMETERS—1/4 TO 3"

RECOMMENDED FOR TELEVISION AND BEAM AERIALS

Price List on Request

STOCKISTS OF SHEETS—ALL SIZES AND GAUGES

GUTHRIE ALLEN METALS

PTY. LTD.

88-92 YARRA BANK ROAD, SOUTH MELBOURNE

Phone: MX 4624 (9 lines)

Telegrams: "Metals," Melbourne.

NOTES

FEDERAL AMENDMENTS TO THE FEDERAL CONSTITUTION

Under the direction of the Federal Council of the Wireless Institute of Australia, the Federal Executive hereby gives notice that it is intended to alter the Federal Constitution (1947) of the W.I.A. as follows:

Interpretation: By adding the following—"Fiscal Year means one calendar year commencing 1st March."

Para. 5: By deleting the words "Commencement of the Federal Convention" and inserting in lieu thereof the words "Conclusion of the fiscal year."

Para. 15: By deleting the word "annual".
Para. 31: By deleting the words from "annually" in the third line to "attend" in the fifth line and inserting in lieu thereof the following: "at least 30 days prior to the conclusion of the fiscal year and shall take office not later than 60 days after the conclusion of the fiscal year and at the conclusion of the Federal Convention, whichever is the sooner."

Para. 38: By adding at the end of the first sentence after "Federal Executive" in the fifth line the words "who shall lay down their terms of reference."

Para. 51: By deleting all after the word "possible" in the 10th line.

Para. 61: By deleting the entire Paragraph 60 and inserting in lieu thereof the following: "At the conclusion of the Federal Convention or within 30 days of the conclusion of the fiscal year, the Federal Treasurer shall present for the approval of the Federal Council statements of the revenue and expenditure, balance sheet and Auditor's Report for the preceding year, together with a budget of expenditure anticipated in the ensuing year."

Para. 66: By deleting the words "By a special levy on all full members of each Division from the second and third lists and inserting in lieu thereof the words: "from the Divisions by a special per capita payment based on all full members of each Division"

Para. 73: By inserting after the word "Divisions" in the first line the word "voting" and by deleting the words "voting in the negative" in the fourth line and inserting in lieu thereof the words "abstaining from voting."

IV. OPERATOR'S CERTIFICATE OF PROFICIENCY EXAMINATION

The Australian Broadcasting Control Board has notified the following candidates that they were successful at the examination for the Television Operator's Certificate of Proficiency held in Sydney, Melbourne, Brisbane, Adelaide, Perth and Hobart on 6th December, 1958:

Sydney: N. L. T. Ancher, R. J. Aylett, A. A. Bell, J. A. Berland, R. H. Brown, R. H. Colpo, M. Cowan, E. J. Eckert, M. J. Johnson, R. A. Lapham, C. K. P. Louer, K. W. Marsden, J. Pearson, J. G. South, H. B. Stockwell, P. Sullivan.

CONTEST CALENDAR

Compiled by W.I.A. Fed. Contest Com.

★

NATIONAL DAY DAY:

Comments on a change of date and on building extra field days during the year would be appreciated.

QZ C.C.C.:

Only Max 2-4.

All Bands.

REMEMBER DAY CONTEST, 1959:

Dates: Saturday, 15th August, to Sunday, 16th August, 1959.

Duration: 1900 hrs. K.A.S.T. to 1759 hrs. Res: As for 1958.

VK-ZL DX CONTEST, 1959:

Dates: Phase—1000 GMT, Saturday, 3rd Oct.—1000 GMT, 4th Oct.
C.W.—10th Oct.—11th Oct., 1959.

Melbourne: S. B. S. Backhouse, R. K. Burbridge, W. A. F. Gorman, R. E. A. A. Grignon, R. D. Haggith, A. K. Hensley, I. J. Israel, E. M. Kennaway, G. P. Lee, A. J. Lyons, R. G. McGowan, B. E. Martin, J. Morrison, P. J. O'Meara, B. H. O'Neill, J. T. Posa, A. Robinson, B. S. Swinburne, M. P. Titchener, F. G. Westaway, A. Zylfiewicz.

Brisbane: W. H. Marshall.
Adelaide: B. G. Hammond, B. M. Hall.

NEW SOUTH WALES

The February monthly meeting of the Division was held as usual at Science House, Gloucester Street, Sydney, on Friday, the 27th, at 7.45 p.m. Members were looking forward to the gathering on a lecture by Leo McMahon and Band was on the agenda for the evening. The attendance was in the vicinity of ninety, including some guests in the form of country members, also YL Amateurs. The lecture, entitled "Cheap and Easy Side Band" was very well conducted by Dr. Leo McMahon, VKGAC. Leo is well known to all through his consistent appearance over the years on 16 Mc s.a.b., and of recent months he has been very active on the 16 Mc band with the proverbial "Duck Talker".

The lecture covered many aspects of single side band, the basic theory, the equipment which appeared to be of easy construction and most practical for the Amateur of today who intends to take the new approach to Amateur two-way communication in the form of s.s.b. Dr McMahon's address, with its consistent insertion of humorous remarks, brought widespread applause and laughter which made the lecture very absorbing. Members went away from Science House very much enlightened and not a few of them Leo ZEL assisted the Dr. in the form of "black board rubber-outer". Many pieces of equipment were on display from portable to home units. Much interest was shown in the equipment. Discussion of the meeting during the usual "coffee break".

A vote of thanks to Leo for his very nice lecture was moved by our old friend, Wal 3SA, and Science House reverberated with one of the greatest evenings given in months. Everybody went home with the same idea in mind, and it should not be long before many more s.a.b. signals are heard on the various Amateur bands.

The usual business was conducted after the lecture and it was brought to the members' notice that the next meeting will be held in March, being Good Friday. Science House would not be available for the March general meeting and a new venue should be found. A suitable hall for one night during this week if possible. Because of this, the Annual General Meeting will take place on April 24 at Science House. Information for the Secretary leads us to believe that the membership in VZ is rapidly approaching the 1,300 mark, which is very gratifying indeed.

A suggestion by Max 2OT on his EWI broadcast a few Sundays ago that members turn out their pockets for small change and forward same to the Secretary as an extra incentive to the rapidly approaching close of the I.T.U. Fund brought forward something over £40.

Some very good suggestions were brought forward by Joe ZJR regarding colour slides and paper for QSL cards. It was decided that the benefit of country members in the form of club groups, etc.

The meeting closed at 10.35 for coffee and a general rag of events during the evening.

WINTER BRANCH

The February monthly meeting was held as usual and the following boys were lucky enough to be in attendance to hear a well delivered lecture by Maurice Findlay, VK2FV, VKs KCS, JAS, ZLZL, 22L, 24PA, 22L, 25P, 24AR, 22B, 22K, 24QR and associates Sutherland, Hall, Bailey, Jackson, Roberts, Rugg, Gray, and Subie. Apologies were received from ZARV and MacLaughlin. Maurice certainly went to town with a clear and precise talk interspersed with colour slides of equipment and circuitry. With the excellent array of lecturers and their subjects I am more than surprised that there are not greater attendances, particularly from the Sydney area. One quarter of those who attend, invariably come more than 14 miles. The same applies to the social gatherings which are held on the fourth Wednesday of the month.

However, getting back to the point, Maurice was sincerely congratulated for his oratory and information and I am sure the mobile seed has been sown.

ZLZ 2APS spent some time in Newcastle and visited some of the local contacts. He was on 22M0 on attaining his Z call: Mac has not long returned from a holiday down south.

Bill 22L and Bob 24QR, with their spouses, took a quick trip to W.A. 24XZ at Geraldton to see what the ZLs had done to him. However, Wal looks bigger and brighter than ever. When they returned to Sydney, Bill 24QR 7-watter, quite a good sign. Rodney, but Pop 24HJ, got you better; at least he was more generous with his report. Let's hope that Stan 22ZL has found the trouble. Stan told Stuart 22ZF that his signal was playing tricks which no respectable 144 mc. station should do over short distances and thought it must be the rx. Little did he know that the Prince of Franksters, Gordon Sutherland, was turning Stuart's beam round and round. No flowery requests!

By the time you read this note our annual meeting will be history and maybe there will be a new name in office. Next meeting to John ZJU, your I.T.U. Representative, will be here demonstrating his stereophonic equipment. If you have not sent your donation to the I.T.U. Fund, here's your chance to square your conscience. See you there at the University of N.S.W., Tighes Hall, at 8 p.m. on the 16th of course. Bill will give an address on tape (and years) around the billiard table on the 28th.

VICTORIA

At this particular time when the frequency allocation debate is being conducted at the forthcoming I.T.U. Conference, is just around the corner, you would expect members to be interested in news items such as the Fair, which does not appear to be the case. This is evidenced by the fact that only 24 turned up at the last meeting to hear our Federal President Max 2OT give an address on tape on this particularly important subject.

Admittedly the night was wet and there were other attractions such as the Fair to lure people away, but our frequencies are our life blood and unless we put more effort into keeping them, we are in for a disaster. Let's take them away from us, then the results must be obvious.

The upsurge in the use of radio for every conceivable purpose has been so great over the last few years and the pressures as high for more and more frequencies, that the allocation of these frequencies is becoming a tremendously complex task. The job was allocated to the International Telecommunications Union who operate on the basis and they in turn have to make their decisions on the claims lodged by the users of all countries. Our Federal Executive is doing a tremendous job of our behalf in this matter by raising our voice at Governmental levels where the resolution of these things is started, but they need the support of the members. Let's make a warm effort we displayed at the last meeting. The captain of any team must have the support of his team mates if he is to stand any chance of winning and that's where we come into the picture.

No doubt a tremendous amount of interest is being displayed in these things as is evidenced by the support given to the I.T.U. Fund which was started to finance our own representation in person at the Conference. Attending the Conference, but it needs much more than this to win the day. It needs effort, constant effort. The effort we must make is to use our hands, attend our meetings, and generally get fired up for the cause. Yes, I know, it's very difficult sometimes to justify a lot of things, but if we think the things we must do it. We simply can't afford to leave it to the other chap any more, otherwise we are promoting a war we are going to lose and find that our diffidence has cost us our bands. Don't kid yourself that this can't happen here. Although the A.R.R. and S.R.R. will most likely hold the allocations in their zones through their well substantiated claims, there is no guarantee that this time we, in Zone 3, will automatically obtain the same.

NEW ADDRESS FOR MAIL TO "AMATEUR RADIO"

All manuscripts, notes and correspondence to "Amateur Radio" should be forwarded to:

P.O. BOX 36,
EAST MELBOURNE, C.2,
VICTORIA

benefits. This is borne out by what happened at the last I.T.U. Conference when we missed out rather badly. On that occasion we had no representative and relied on the generosity of others to state our case.

This time it is up to us to a large extent and if we back our representative to the hilt, there is every chance that he will be in a position to influence the issue to our advantage. If we don't use our brains we stand to lose. This is fundamental, and what proof are we giving that we really need our present allocations? Take a look around the bands sometimes. Others do and become vocal at the lack of activity displayed. How many chaps have had humors for years and never been active? You would be surprised if you knew. Officialdom and frequency seekers have eyes and ears the same as we have and this is not the sort of thing that wins friends and influences people on our way of thinking.

We have plenty of evidence to prove conclusively that we need our bands and can put them to far better use than most of those who would deprive us of them, but what are we doing to prove these points? Yes, I know, there are active groups here and there plugging away doing their bit, about 1,500 blokes have contributed to the I.T.U. Fund and we are endowed with a solid core of enthusiastic workers of the calibre of Max Hull pushing our case, but there is a voice in the wilderness without amplification. We need all the Amateur fraternity to be lending their weight to the cause, not the willing few. In this way the willing few will be spurred on to even greater efforts and we could really go places.

The average chap does not appreciate how disheartening it can be for an office-bearer in an organisation to be left on his own and not have the active support of his members. When it is all boiled down, this matter of frequency allocations is not something that affects only the upper strata of our Institute as some chaps seem to believe, it affects all of us even posterity if we like to look that far ahead.

It should be quite clear then that up to us we can find time to throw our weight behind the wheel and take a keen interest in what is going on, the cause which has been so carefully built up to its present state is going to be lost. Maybe not entirely but to what extent—who knows.

Therefore resolve to get into this business. Find out the facts by listening to our Federal

President's address. This shouldn't be hard because it is recorded on a number of tapes and will no doubt be available to groups to hear. It will also probably be broadcast over 3BW and should appear in the magazine, so for goodness sake make it your business to hear it. It will open your eyes to some very interesting facts and if taken to heart will be the means of obtaining that united effort which is essential if we are to advance and justify our existence.

Remember, there are not nearly enough frequencies to go around and most of those seeking them have loud voices and stiff backing. At the moment the Amateur organisation is a recognized service for the purpose of frequency allocations and we must keep it that way. This state of affairs has been mainly due to the efforts of the A.R.L. and the R.S.G.B. With the pressures that now exist it is too much to expect that these organisations can fight our cause any longer and we must stand on our own feet. Executive has done its part most ably by obtaining an accredited representative to accompany the Government team to the Conference. It is now up to us to give them the necessary backing to give substance to their arguments.

Don't say you haven't been warned. The writing is on the wall and if you want to keep your bands, then you must give your active support to the utmost of your ability. There is no alternative to this, am afraid, as yet cracking!

New members admitted at the meeting were W. J. Hewitt (3PR) and A. F. Nickson (3WB). The next monthly meeting of the Division is the Annual General Meeting. There will, therefore, be no lecture on this occasion.

EASTERN ZONE

Activity in the zone is very lax at present. What about it boys, don't you remember we have a song book-up on Sunday at 8 p.m. on 3850 Kc. Believe Ron 3PR is rebuilding the 1.1 generator in an effort to cure L.V. The 3.1 max gain still appears to be active, including 3ZAB, 3ZCR, 3ZDF, 3TH and 3ZD. Reg 3ZCR is going for the full ticket. David 3DY is home building and filling in spare moments constructing an 813 final.

SOUTHERN ZONE

Things very quiet up this way with not much activity reported. 3AGG now moved into his

new shack complete with beam motor, electrical indicators and what have you. A very nice set-up if I may say so. Brian 3ASF now has a quad in the course of erection and in due course hopes to be amongst the DX on 30 mc. Like to welcome to the Ham Fraternity 3UW at Bandiana and 3ZGH of Shepparton, while a newcomer to the Zone is SPN at Mangalore. Sid 3CJ is off on another jaunt to Gippsland and I suspect it is for fishing.

Most news of the month comes from Kybarram where 3ARO has a Sterba curtain, a rhombic for 10, 15, 20, and a T.V. antenna surrounding the QTH. Bill has been getting good results on 10 mc during the afternoon, 15 mc treating him very well as he has worked and confirmed 100 countries on his DXCC (confirmed) in the last six months. This is really good as many of us have been struggling for years to obtain the confirmations for DXCC with little results. Bill tells me that the rhombic is really OK on 10 and 15, but the

W.I.A. SOUTH WEST. ZONE CONVENTION

will be held at
GEELONG

on

11th and 12th APRIL, 1959

A welcome is extended to all those interested to attend. Activity mainly will be centred on 3.5 and 7 mc. and v.h.f. Hotel and dinner bookings must be made not later than one week prior to Convention—10/- deposit for hotel booking.

Further information is available from Geelong Amateur Radio Club members and Sunday morning VK3WI Broadcast.

STANDARD 19 inch RACKS

- ★ Solid construction with strong gusset welding on each of the four corners, ensuring rigidity.
- ★ Standard panel mounting hole spacings, drilled and tapped $\frac{1}{8}$ inch Whit., held to plus or minus 1/32 inch tolerance.
- ★ Cable clamps can be fitted to inside of each vertical channel.
- ★ Each Rack is normally drilled and tapped to accommodate cable clamps which can be supplied as an extra.
- ★ Mounting bases can be provided with bolts in lieu of welding if required.
- ★ Finish: Battleship Grey.
- ★ Manufactured to P.M.G., R.A.A.F., D.C.A. and other Government Department specifications.



PRICE:

7-FOOT RACK

£16/16/0

Freight and Packing additional.

Racks of other heights —price on application.

Enquiries for Special Racks welcomed.



ZEPHYR PRODUCTS PTY. LTD.

58 HIGH STREET, GLEN IRIS, S.E.6, VIC.
Phones: BL 1300, BL 4556

Magazine.—Mr. E. C. Daw is Divisional Sub-Editor of the Magazine, and he does a fine job with the Divisional notes. He is always anxious to obtain news items of interest for the magazine, and he is always at the ready during the year this Division contributed several articles for the magazine and I trust that during the next year you will have items of interest will forward them to Comps.

The v.h.f. notes were supplied by Neil White (3ZAL).

Allen Kaye.—During the year Doug Whitburn passed away. Doug was one of our earliest members and served the Institute in many capacities. To most members he is associated with our Buy and Sell nights, and they have, in a way, become a memorial to him. To his widow and to his two children we extend our deepest sympathy.

Lectures.—Five lectures on various technical subjects were given at the Institute in the year and in addition a special meeting was held at the Physics Department, University of Adelaide at which a number of brief talks were given on radio and electrical theory. The other monthly meetings were taken up with two Buy and Sell nights, two Picture evenings, a display of members' gear, and the Christmas Social.

To all the lecturers, and to Messrs. Parsons and Colman, who conducted the Buy and Sell nights, our thanks.

Associates' Representative.—Norm Colman has done this job for several years, bringing to Council's notice many things of general interest to our Associate members. Unfortunately, he is unable to continue in the position in future and I would like to express the opportunity of thanking him for his many hours of work.

Communications.—Mr. J. Kilgiff (5FT) continued as Communications Officer and has handled all inter-Division traffic during regular weekly schedules. He reports as follows: "Messages handled—Outward 1,468 messages, 353 groups; Inwards 465 messages, 1,468 groups."

QSL.—Officer—George Luxon (6RX) has been QSL Officer for many years. This service is one which is appreciated by all members, and our thanks go to George for the quietly efficient way he handles it.

General.—This year has been a very busy one for the Institute. Council members generally and, in particular, members committed to many many things in the performance of their duties, and to them I would like to express my appreciation.

With C.E.N. and the Activities have brought much favourable publicity for the Institute.

The notes in the "Advertiser" are still supplied by Warwick Parsons in spite of the occasional death of new and old. I would like to thank him for his efforts on our behalf.

My first year of office has been made easy by the co-operation and assistance, not only of C.E.N. members but of all members of this Division.

Finally, I would like to express my gratitude to the members of Council for their confidence in electing me to the Presidency, and to thank each member for his loyal support and guidance during the past year.

Needless to say, the report was adopted, as also was that of the Treasurer, who dealt with figures, but once again informed members that as a result of the healthy state of finances no membership increases were contemplated.

Next month we will bring you up-to-date on the new Council personnel and the officers for the year; and we will permit at this juncture to enlarge any further.

— . . . —

WESTERN AUSTRALIA

At the last meeting we had the pleasure of reacquainting ourselves with Dave WIAFP, who is on a world tour. Dave addressed the meeting in his own inimitable style. Following on, we were entertained by George GCR, our patron, who just returned from a tour of Japan and the U.S. Both talks were very much appreciated by all.

President and Treasurer. The two of our country members—Francis BWD and Bob GZBY, Francis went on the next day visiting GRE and Alan WVL in Brown. Unfortunately, they had had a terrible car accident, suffering some damage to the internal works of the vehicle, due to a most unusual fault.

SKV.—Aural Contest for this Division, has already left for Melbourne and Sydney. During his stay he will attend the Federal Convention at the Institute in Melbourne. One item submitted by this State is that the next Convention be held in VKS during the Empire Games year, 1962. It is realised that some considerable amount of finance must be con-

tributed by this Division to compensate the other States, but we think it should be worthwhile. Financially, we must remember that VKS and VKCZ contribute most of the fares to the last 25 years. Incidentally, the last Convention to be held in VKS was the second one in 1925. Present members 6AG, 6H3 and 6WP were all present at that Convention, all in official capacities.

A new meeting place has been found for the general meetings in the main Trade Block of the Technical School. This was allocated by the demolition of the Annex buildings to make way for the Freeway for "That Bridge". 6GB and 6ZRU (at present) trans-bought in (Mandurah) continue their nightly Owlhows, this time all on 50 Mc. Getting past the cross-town natter at 43 miles.

6H3 and 6H4 can be heard scheduling nightly on 3.7 also. Don't hear much of you these days, Terry.

Mal GSM has really got it bad on the DX bands. He can be heard nightly on 10 or 13 metres. Believe Mal has passed the century and very nearly has the required number of 800A. Nice going for 12 months or so of operation.

News is scarce this time. Not much doing at present, so will give it away for this month. Cheers.

TASMANIA

NORTH WESTERN ZONE

Hello, chaps! Yours truly at his typewriter and the other month has been slipped by and it's time for these notes once more; I seem to be always scratching notes together for the zone. Our last zone meeting, in the form of a night of instruction, was held on March 3.

HAMMAD

1/- per line, minimum 3/-

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of surplus equipment which is of personal property. Copy must be received by 8th of the month, and remittance must accompany advertisement. Advertisements are charged on an average of six words a line. Dealers' advertisements not accepted in this column.

DISPOSAL: Prop. Pitch Motor. 2 Sel-syns, Transformer to suit, both set for £15. 2 mx Tx and Rx, both xtal controlled, built around a 3-6 meg. Command Rx as an i.f. Also in same unit, d.f. equipment for 80 mx Tx hunt. Complete with xtal mic. and 300v. 125 ma. 240v. a.c. 6v. d.c. power supply, no speaker. £17/10/0. 829B. £2/10/0. Double spaced variable condensers suitable for split-statoring, 110 pF., 10/- each. 3 elements for 10 mx beam, £2 the set. 3 elements for 15 mx beam, £2 the set. Ring UM 7221 (Bus.) for further particulars. R. Yeats, 28 Elizabeth St., Clayton, Vic.

EXCHANGE or Sell: Triplet Signal Generator, Model 1632, 100 kc. to 120 mc., crystal calibrator, output meter, etc., with instruction book and circuit diagram, for Communication Receiver in good order. Cash adjustment if necessary. What offers? J. Rintoul, 11 Cindra Street, Ipswich, Qld.

FOR SALE: BC348 Rx with p.s. and spkr., £30. No. 11 Trans., works well, £5. Power trans., meters, etc., cheap. Want 22 or 122 Trans. Fisher, Fairview Av., Glen Waverley, Vic. UL 2428.

FOR SALE: Front end for Amateur Receiver, r.f. stage, bandpass, switched bands 3.5, 7, 11, 14, 21, 28 mc. Only had few hours use. £12 or offer. M. A. Jones, 6 Powell St., Mt. Gambier, South Aust.

at the usual QTIL. 18 chaps turned up to both absorb and radiate knowledge. A lecture by Peter TFF had to be postponed owing to a misunderstanding. But I guess we will have the lecture later. Questions asked for and duly answered by an appointed panel. A goodly talk on Regulations was delivered by our Secretary. Another of those colossal raps was partaken of and enjoyed by all. Many hands made light work of the washing up. A very small quantity of junk was disposed of in the evening, ended with small groups gathering all round the meeting room and having the inevitable ragchew over their pet subjects and avarice.

A tx hunt (two in fact) was held on Feb. 2 with yours truly, TIT, operating the hidden "source of annoyance". TJS was first to show up on the first run, locating the hiding place by pulling down the antenna and following it into the bush. Signal reports were better with the antenna on the ground! A second hunt was provided after dinner, with associates. Alan Baptist and Ray Schulze making a very quick catch. New associate Geoff Sharp was third in. Good work, Geoff! Afternoon tea was shared with the flies and I think a good day was had by all. I also believe there is to be another hunt organised before the weather breaks for winter.

What do you know chaps, Sam TSM has got that last State, so has now (W.A.S.) worked that State and avarice.

Max TMX has got his new rig in operation using about 60w. on all bands, I think, and is taking some of the same time for a universal screen modulation, too. You ought to see the modulator, it will fit into any decent-sized cat pocket-mike as well; seems to make that extra power supply and the usual costly modulator transformer also.

Don't forget the next general meeting will be April 7. (Thanks for double spaced legible copy, Terry. Greatly appreciated.—Ed.)

FOR SALE: Imported Panda PR120V

Transmitter, 120w. input power, 150 c.w., 2/807s parallel output pi-net to co-ax. outlet. Band switched 80 to 10. Completely enclosed in solid steel case, filtered leads, t.v.i. proof, carries maker's service, £285. This is not a mini-mitter but the full rated job. F50 transceiver, modulator, power supply, antenna on 40 metres, and to plate and screen modulation, complete with vibrator power supply, phones, mike, cables, etc. £20. Inspection and enquiries invited. E. C. Daw, Box 44, Gawler, S.A.

FOR SALE: Tx-Rx Type 3 Mk. 2,

complete with carry-case, perfect working order, £25. Universal Taylor 90A Test Meter, 40 ranges covering AC, DC, resistance, capacity, decibels, size 8" x 5 1/2" x 4". £7. Photax Professional Photographic Dryer (flat twin sized 24" x 18" rotatable) AC 200-250 volts, thermostat control, with glazing plates, chrome plated steel, perfect, unmarked as new, £25. Ghormley Master enlarger (35 mm. to 2 1/4 x 3 1/4) with extension column, base board and masking frame, as new, £25. A. Swindon, 87 Brighton Rd., Elwood, S.3, Vic. N.A. 1432.

SELL: 150 watt shielded 6146 pl final

TX with Gelofo v.f.o., 8146 AB1 modulator with compressor on same chassis. Heavy duty power supply A & R Transformers. 806s, voltage regulated v.f.o. and modulator screens. VR tube keying. Complete in two units. All new components, no junk. Circuits to buyer. Offers in vicinity of £100 to P. D. Williams, Kent-Hughes Rd., Eltham, Vic.

WANTED: Handbook for No. 19

A.W.A. Transceiver No. J8788. G. Warner, Bringley, N.S.W.

WANTED To Buy: An AMR300 Re-

ceiver. R. Leske, 15 Cecil Street, Hordsham, Vic.

Homecrafts

EVERYTHING IN RADIO AND TELEVISION

AMATEURS' BARGAIN CENTRE

COLLARO 4-SPEED HI-FI TRANSCRIPTION TURN-TABLE, £31/2/6

CONQUEST — the new Collaro 4-Speed Automatic Record Changer, £18/1/6

COLLARO 4-SPEED RECORD PLAYER £12/10/0

The world's best COLLARO 3-SPEED TAPE DECK with four HI-FI Heads — £32/10/6

SPECIAL

BSR TU-0 6v. DC Turntable £9/10/0
BSR TU-9 230v. AC Turntable £7/18/0

THORENS

RECORD PLAYER CB83N Manual Player, variable speed adjustment, with 18 inch turntable, easy weight adjustment. £25/0/0

RECORD CHANGER CD43N Fully Automatic Changer, including pause control. £35/0/0

SAPPHIRE REPLACEMENT Stylus to suit Collaro, B.S.R., Garrard, velvet action record changers and players. Easy to fit yourself, 11/6 each.

DIAMOND STYLUS for Collaro, B.S.R., Garrard Players and Changers £7
For Dual Players and Changers, std. Sapphire, LP Diamond £7/11/6

HI-FIDELITY ELECTRO-STATIC TWEETERS available now. Price 32/6

COSSOR V.T.V.M. KIT SETS

£29/14/0 plus 12½% Sales Tax. Complete with instruction books, diagrams and printed circuit.

Brand New
Baker 12 in. Hi-Fi De Luxe Speakers, £14/19/6
Limited number only.

PRONTO SOLDERING GUN HOT IN FIVE SECONDS, £6/10/0

SCOPE SOLDERING IRON SPARES

Carbons	1/-
Bite	10s
Bakelite Handles	13/4
Flex Leads	8/4
Centre Rod Assemblies	8/4
Steel Barrels	8/4
Ceramic Beads	4d.
Retaining Nuts	1/3
Switch Nuts	1/3
Scope AC/DC 6v. 6-seconds Soldering Iron	£12/10/0
Scope 230v. Transformer	49/7
1/2 in., 5/32 in., 3/16 in. Spin Titles	11/6

GLEN RADIO AC/DC INVERTERS

50 watt Inverters: 12, 24, 32, 50, 110, 230v. DC input; 230v. 50 cycles AC output, £22/9/6.
100 watt Inverters: 12, 24, 32, 50, 110, 230v. DC input; 230v. 50 cycles AC output, £25/2/6.
150 watt Inverters: 12, 24, 32, 50, 110, 230v. DC input; 230v. 50 cycles AC output, £27/1/2.

METAL CABINETS

Set of 16 Drawers, 48/6

ZEPHYR MATRIX BOARDS

No. 2083—8 holes wide x 3 in. 1/7 ea.
2083—6 " " 6 " 3/8 " " " " " " 12 " 9/8 " " " " " " 36 " 12/7 " " " " " " 12 " 9/1 " " " " " " 250—Small Pin, Solder Lugs 2/6 dt.
252—Large Pin, Solder Lugs 2/6 dt.
254—Right Angle Brackets 3/- dt.
255—Valve Socket, 7-pin 3/11 ea.
256— " with shield 8/9 " " " " " " 1/2 " " " " " " 16/7 " " " " " " 2/- dt.
281—Eye Bolts " " 38/11
282—Rivetting Tool " " 38/11

High Quality "Brown" Headphones, Type "F" 60/- plus 25 per cent. Tax

Homecrafts Pty. Ltd. for the Finest Stereo and Hi-Fi Record Playing Equipment.

MOTORS

Garrard 301 — £46/7/6
Connoisseur — £40/10/0
Orpheus — £39/12/6
Commonwealth Electronic: Non-syn. type 12B1 £19/17/6
Synchronous type 12B £38/17/6
Lenco — £38/9/6

AMPLIFIERS

Pilot, 12 watt — 89 Gns.
Aegis 3-4 — £37/19/6
Aegis 5-10 & control unit £48/7/6
Gramphon, c/w. pre-amp. unit £38/16/0
Leak TL12 c/w. Mk. III. pre-amp. unit — £166/15/0
Quad — £113/12/0
Steinbe 8 watt Hi-Fi EV4430 £47/15/0
Armstrong A10 — £82/19/0

PICK-UPS

Leak c/w. diamond head and transformer — £53/18/4
Orison c/w. type A sapphire L.P. head and transformer — £18/9/0
Acos Black Shadow — £17/15/0

STEREO—

Players and Cartridges
BSR Players HFS/5 — £16/14/4
BSR Changers UAS/5 — £22/9/6
Dunl 10C4/S — £37/9/6
Rostle Cartridges — £4/15/6
TCR/S Cartridges — £3/5/0
Acos GP71 Cartridges (diamond) — £18/17/0
Acos GP72 Cartridges (sapphire) — £25/15/0
Goldring G80 Arm less Cart. ridge — £8/18/0
FULL STOCKS of all available Stereo and Monaural Equipment for immediate delivery.

TRANSISTORS

All available Types Stocked

PHILIPS

OC16G	59/4	OC70	27/1
OC34	38/10	OC71	27/1
OC45	38/7	OC77	29/10

S.T.C.

TJ1	116/8	2N185	31/10
TS1	27/8	2N208	52/8
TS2	59/8	2N252	55/8
TS3	32/8		

DIODES

OA70	5/3	GEX35	4/8
OA79	6/3	GEX45	12/11
OA81	5/7	GEX34	12/11
OA85	7/4	GEX35	22/7
GEX00	4/11		

Transistor Transformers

ROLA

TR7 Output 425/3.5 ohm — 13/9
TR8 Output 200/3.5 ohm — 18/0
DR4 Driver 3000/1350 ohm — 18/0
TR18 Output 375/2.5 ohm — 21/9
DR17 Driver 3000/2800 ohm — 21/9
TR27 Output 450/15 ohm — 22/3
DR27 Driver 4000/3000 ohm — 22/3

Latest Model 4-SPEED CHANGER £12 for this month only.

TV ANTENNAE

A complete range from £4/15/0

AVO 10,000 ohm per volt, Pocket Multimeter £9/12/0 plus tax.

ASTOR TV-1 3 in. Oscilloscope. Complete with gratings, etc. £65 plus 12½% Sales Tax.

ROLA SPEAKERS

3C	£1/12/0	8M	£2/3/0
4C	£1/11/0	12-O	£4/0/0
5F	£1/7/0	13-O De Luxe	
4-SC	£1/7/0		£6/10/0
5C	£1/13/0		
5CK	£1/18/0	12-MK, twin	
5F	£2/2/0	cone, £8/16/6	
5FX	£2/3/0		
5-TH	£2/8/0	12-XC, twin	
5-TH	£2/8/0	cone, £11/4/0	
6M	£3/18/0	12UX Hi-Fi, 15	
6-HE	£2/15/0	ohm V.C.	
8-PA	£3/3/0		£28/19/6

290 LONSDALE STREET, MELBOURNE

FB 3711

MICROPHONES

OF TOP QUALITY

for Amateur and Professional Use

HI-FI in the transmission of T.V. Stations has demanded wide frequency range and rugged microphones. These "SENNHEISER" ("L.W.") Microphones cover all applications of the professional user.



MODEL MD1T

A table microphone of excellent performance and smart appearance, characterised by the slim curved light metal tubes connecting the nest mouthpiece to the moving coil system hidden in the ball. Excellent for lecture rooms, pulpits, etc. Frequency range, 50 to 10,000 c.p.s.

MODEL MD82

A highly directional Tele-Microphone, equipped with a high quality rugged moving coil system housed in a crash-proof light metal casing. Extreme directional effects make it ideal for recording, or use where obstructions prevent close proximity to the source of sound. Frequency range, 50 to 10,000 c.p.s.

MODEL MD21

An ultra-high-fidelity moving coil microphone for natural transmission of speech and music. Although moderately priced, it is a unit of first class quality, embodying novel design and construction. Frequency range, 50 to 15,000 c.p.s. Internal impedance 200 ohms. Desk stand optional.



MODEL MD12

This new compensating, reduced feed-back microphone is used wherever it is necessary to obtain perfect speech transmission under exceptionally bad acoustic conditions or for eliminating unwanted noise, e.s. in speech transmission from noisy rooms. Frequency range, 200 to 10,000 c.p.s.



MODEL TD421

A wide range transformer having flat characteristic response from 25 to 20,000 c.p.s. Complete with mu-metal cover.



A complete catalogue of SENNHEISER ELECTRONICS products is available on request to:—

Sole Australian Factory
Representatives:

R. H. CUNNINGHAM PTY. LTD.

8 BROMHAM PLACE, RICHMOND, E.1. VIC. Phone: JB 1614. Cable: "Cunnig" Melbourne.
16 ANGAS ST., MEADOWBANK, N.S.W. Phones: WY 0316, WY 3852. Cable: "Cunnig" Sydney.